ORDER NO. AD9611202C2

Service Manual

CD Changer

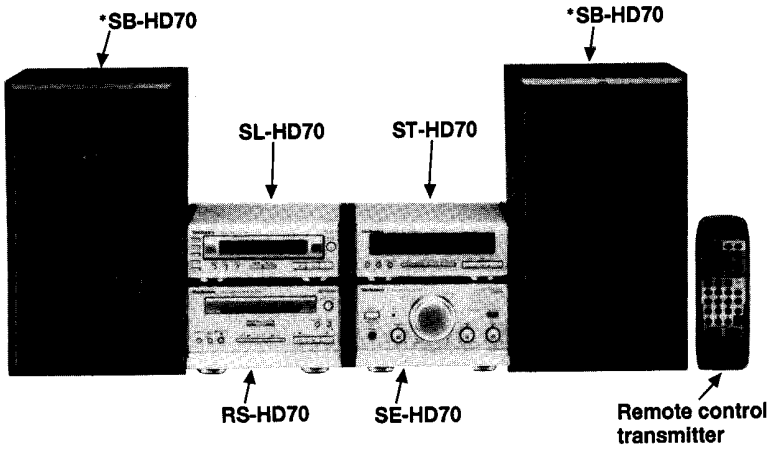
Compact Disc Changer

SL-HD70

COMPACT disc DIGITAL AUDIO

MASH multi-stage noise shaping

※ MASH is a trademark of NTT.



Because of unique interconnecting cables, when a component requires service, send or bring in the entire system.

Colour

(N) ..... Gold Type

Area

E ..... Europe.

System: SC-HD70

RAE0161Z Mechanism Series

Specifications

Audio

DA converter: 1 bit 2 DAC MASH※

Pickup

Wavelength: 780 nm

General

Dimensions : 196(Wide)/ 67(High)/ 229(Depth) mm

Weight: 1.7 kg

Notes:

1. Weight and dimensions shown are approximate.
2. Design and specifications are subject to change without notice.

System	Tuner	CD Changer	Amplifier	Cassette deck	Speakers
SC-HD70	ST-HD70	**SL-HD70**	SE-HD70	RS-HD70	*SB-HD70

*Made in PAES

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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NOTES:

- **Refer to the service manual for Model No. ST-HD70 (ORDER No. AD9610197C2) for information on "Installation " and "Connections".**
- **Refer to the service manual for Model No. SE-HD70 (ORDER No. AD9610196A2) for information on "Accessories".**

■ Precaution of Laser Diode

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pick lens.
Wave length: 780 nm
Maximum output radiation power from pickup: 100 µW/VDE

Laser radiation from the pickup lens is safety level, but be sure the followings:

1. Do not disassemble the optical pickup unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pickup unit. It was already adjusted.
3. Do not look at the focus lens using optical instruments.
4. Recommend not to look at pickup lens for a long time.

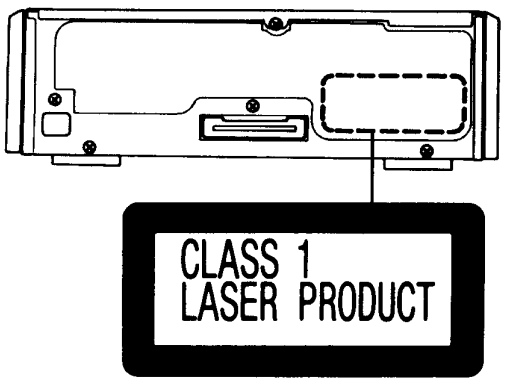
ACHTUNG: Dieses Produkt enthält eine Laserdiode. Im eingeschalteten Zustand wird unsichtbare Leserstrahlung von d Lasereinheit abgestrahlt.

Wellenlänge: 780 nm
Maximale Strahlungsleistung der Lasereinheit: 100 µW/VDE

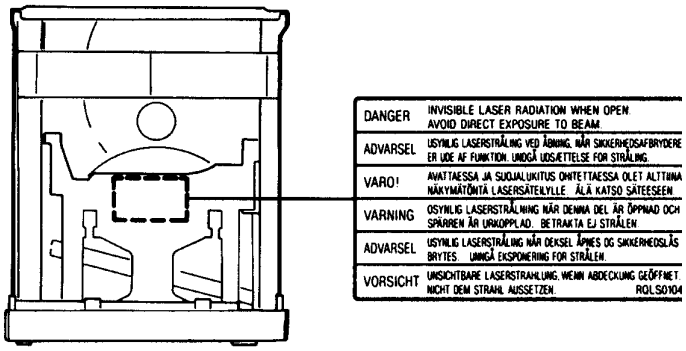
Die Strahlung an der Lasereinheit ist ungefährlich, wenn folgende Punkte beachtet werden:

1. Die Lasereinheit nicht zerlegen, da die Strahlung an der freigelegten Laserdiode gefährlich ist.
2. Den werkseitig justierten Einstellregler der Lasereinhit nicht verstellen.
3. Nicht mit optischen Instrumenten in die Fokussierlines blicken.
4. Nicht über längere Zeit in die Fokussierlines blicken.

Back side



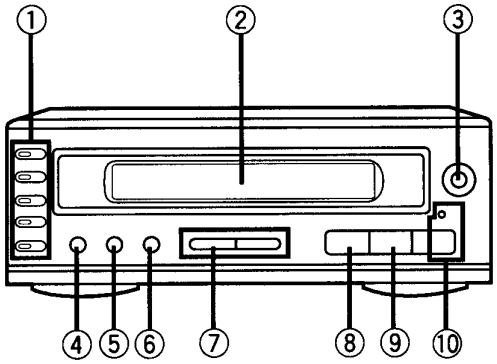
Upper side


DANGER
INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
ADVARSEL
USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO!
AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖNTÄ LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING
OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄR URKOPPLAD. BETRAKTA EJ STRÅLEN.
ADVARSEL
USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.
VORSICHT
UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.
RQLS0104

LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

CAUTION!
THIS PRODUCT UTILIZES A LASER.
USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

■ Location of Control



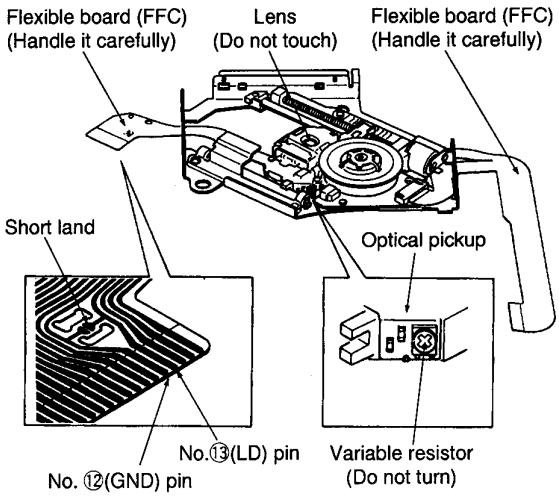
① Disc select buttons and indicators (DISC)
② Disc tray
③ Disc tray open/close button (≜ OPEN/CLOSE)
④ Random play button (RANDOM)
⑤ Repeat button (REPEAT)
⑥ AI edit button (AI EDIT)
⑦ Skip/search buttons (⏮ / ◀◀ , ▶▶ / ⏭)
⑧ Stop button (■)
⑨ Pause button (❚❚)
⑩ Play button and indicator (▶)

■ Handling Precautions for Traverse Deck

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body.
So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

● Handling of traverse deck (optical pickup)

1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. The short land between the No. ⑫ (GND) and No. ⑬ (LD) pins on the flexible board is shorted with a solder build-up to prevent damage to the laser diode.
   To connect to the PC board, be sure to open by removing the solder build-up, and finish the work quickly.
3. Take care not to apply excessive stress to the flexible board (FFC).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

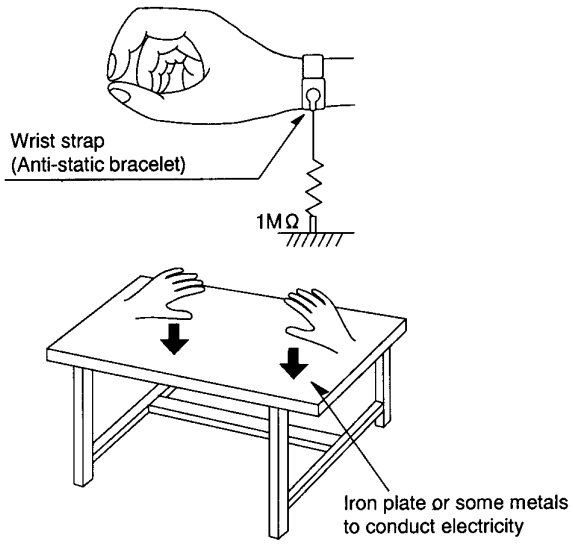


● Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table grounding
   Put a conductive material (sheet) or steel sheet on the area where the optical pickup is placed, and ground the sheet.

Caution:

The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).



■ Operation Checks and Main Component Replacement Procedures

NOTE

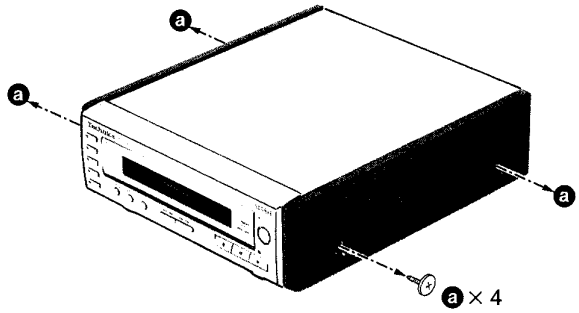
1. **This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.**
2. **For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.**
3. **Select items from the following index when checks or replacement are required.**
4. **Refer the parts No. on the page of "Main Component Replacement Procedures", if necessary.**

• Contents

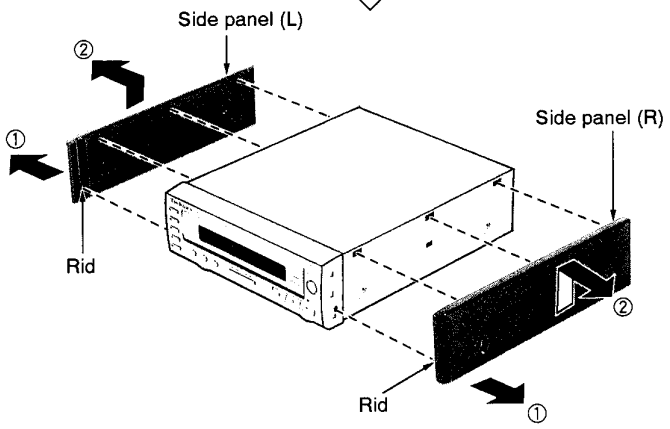
• Checking Procedures for each P.C.B. page.
1. Checking for the main P.C.B. and operation P.C.B.. • • •

■ Checking procedures for each P.C.B.

Checking for the main P.C.B. and operation P.C.B.

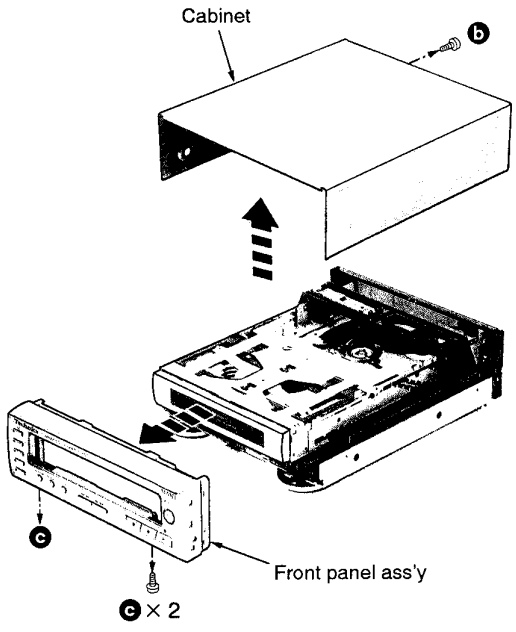


Step 1 Remove the 4 screws (a).



Step 2 Remove the side panel (L),(R).

• Spread the lower part of the side panels in the direction of arrow (➡①) to release the ribs, and then lift to remove the side panels (➡②).

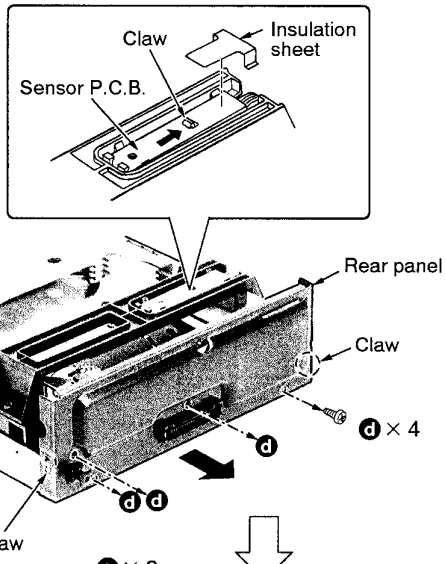


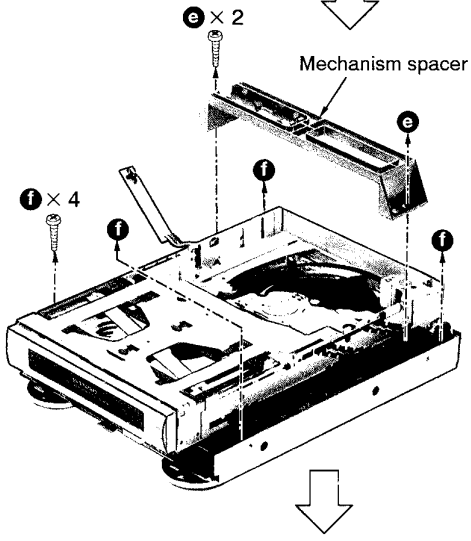
Step 3 Remove the 1 screw (b).

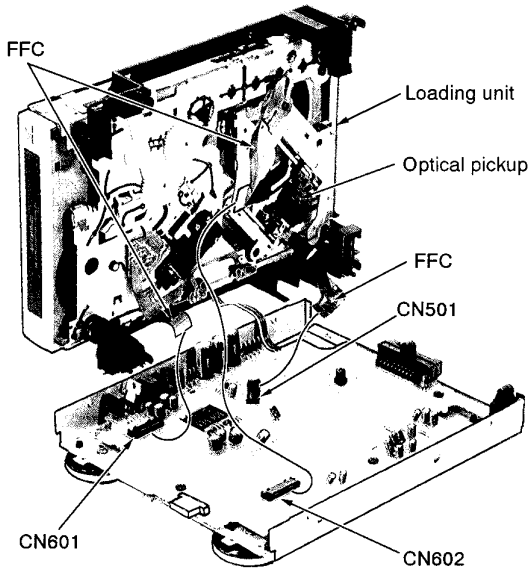
Step 4 Remove the cabinet.

Step 5 Remove the 2 screws (c).

Step 6 Pull out the front panel ass'y.







Step 7 Remove the insulation sheet.

Step 8 Release the claw, and then remove the sensor P.C.B..

Step 9 Remove the 4 screws (ⓓ).

Step 10 Release the 2 claws, and then remove the rear panel.

Step 11 Remove the 2 screws (ⓔ).

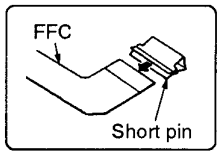
Step 12 Remove the mechanism spacer (C).

Step 13 Remove the 4 screws (ⓕ).

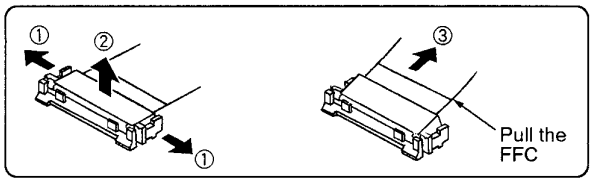
Step 14 Lift up the loading unit, and then remove the FFC.

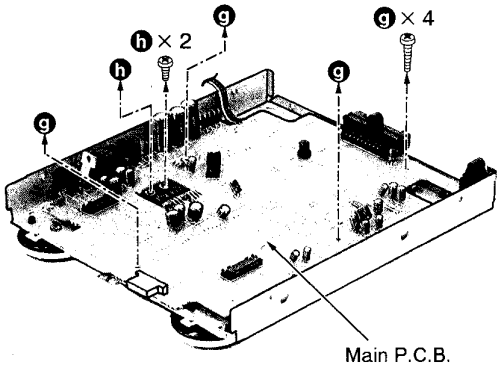
NOTE

Install a short pin into the optical pickup FFC.



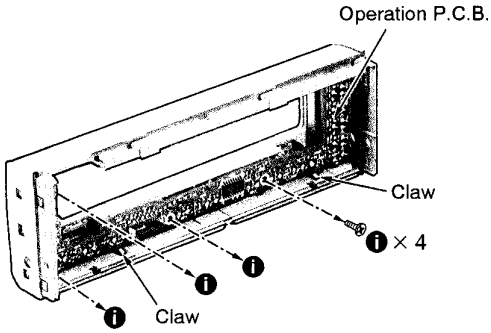
Removal of the FFC





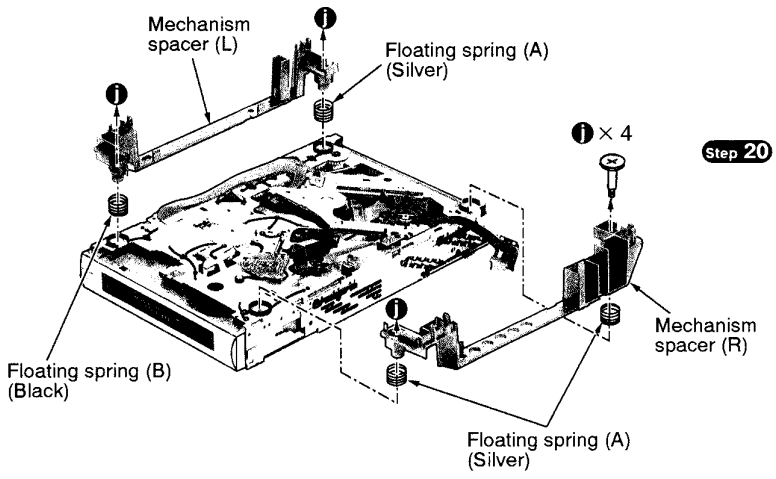
Step 15 Remove the 6 screws (ⓖ, ⓗ).

Step 16 Remove the main P.C.B..



Step 17 Remove the 4 screws (ⓘ).

Step 18 Release the 2 claws, and then remove the operation P.C.B..

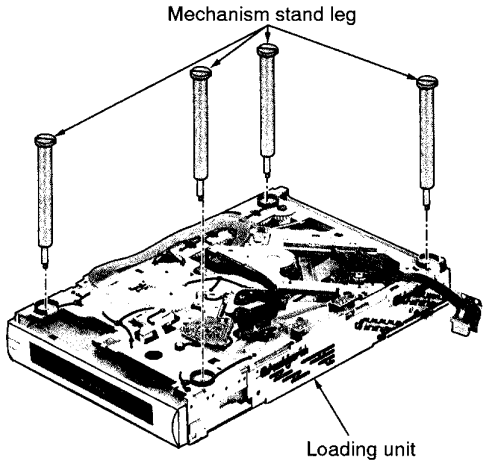


Step 19 Remove the 4 screws (ⓙ).

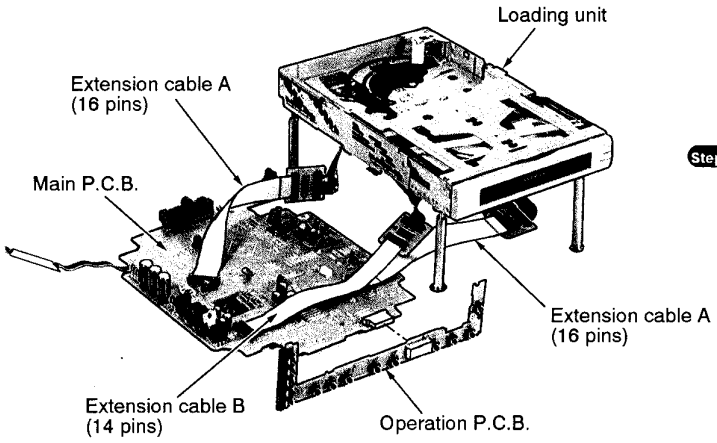
Step 20 Remove the mechanism spacer (L), mechanism spacer (R), floating spring (A) and floating spring (B).

NOTE

• Take care not lose the floating spring (A) and (B).

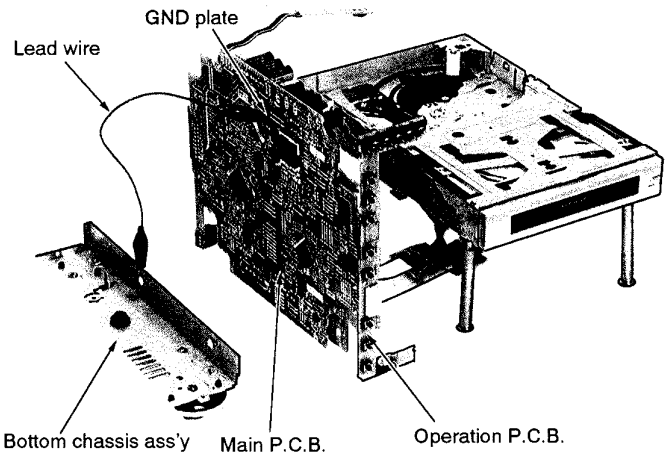


Step 21 Install the mechanism stand leg to the loading unit.



Step 22 Connect the extension cables between the FFCs and connectors.

Step 23 Install the operation P.C.B. to the main P.C.B..

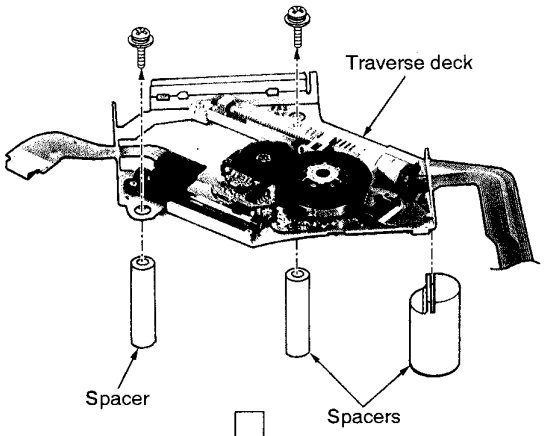


Step 24 Connect the lead wire between the GND plate and bottom chassis ass'y.

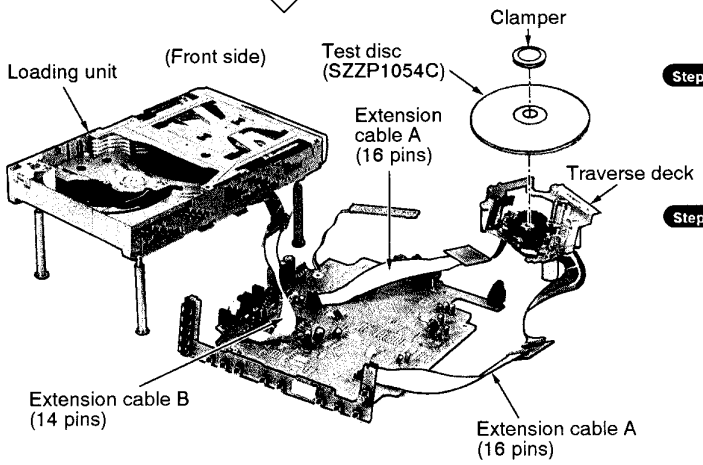
Check the main P.C.B. and operation P.C.B. as shown left.

Checking for the traverse deck separated from the loading unit.

Follow the traverse deck replacing procedures (Step 1 ~ Step 5) on the main components replacement procedures. (See pages 10 and 11.)

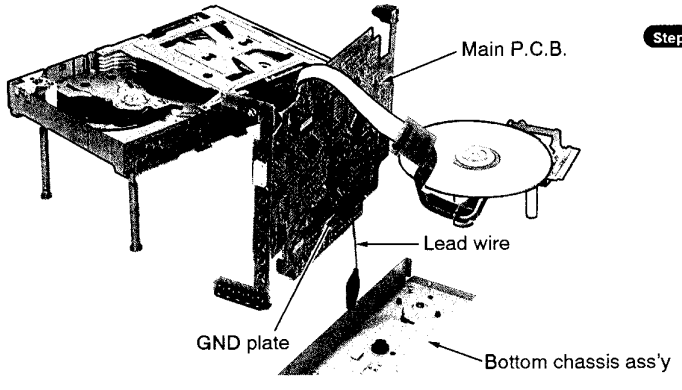


Step 1 Install the spacers (3 points) to the traverse deck.



Step 2 Connect the extension cables between the FFCs and connectors.

Step 3 Install the test disc to the traverse deck and fix it with clamper.



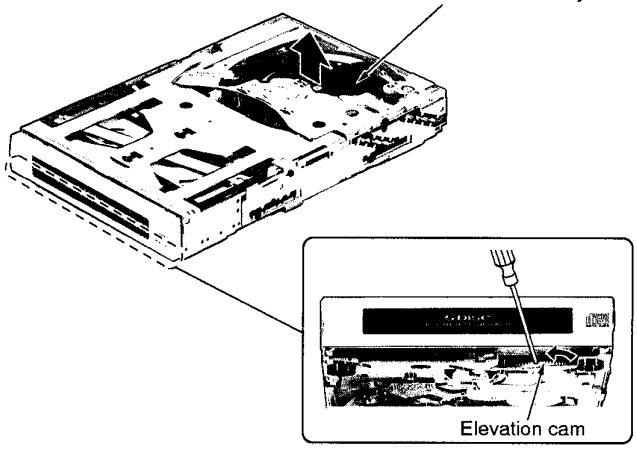
Step 4 Connect the lead wire between the GND plate and bottom chassis ass'y.

Check the main P.C.B. and operation P.C.B. as shown left.

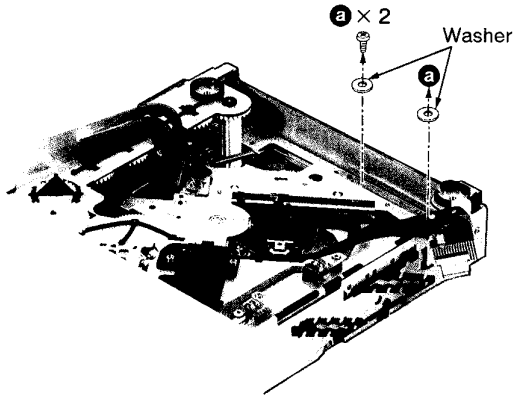
■ Main Component Replacement Procedures

Replacement for the traverse deck and spindle motor ass'y.

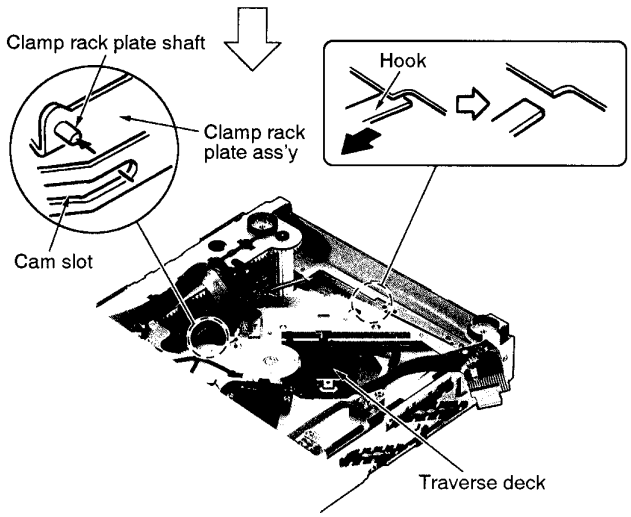
Follow the items (Step 1 ~ Step 5) of main P.C.B. checking. (See page 5.)



Step 1 Rotate the elevation cam in the direction of arrow (counterclockwise), and then rise the elevation block ass'y.

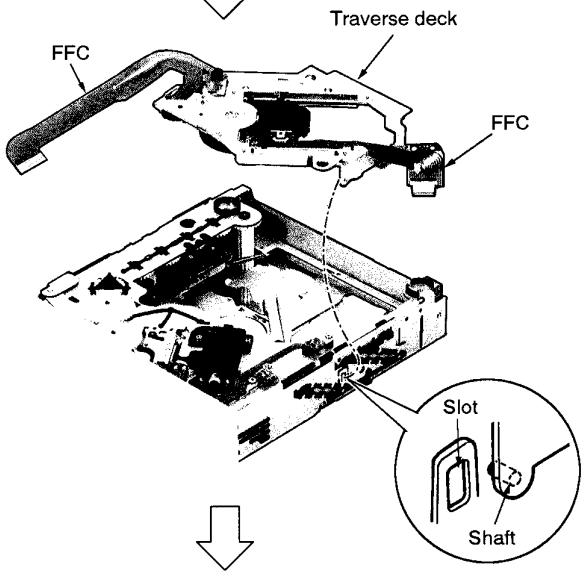


Step 2 Remove the 2 screws (ⓐ) and 2 washers.



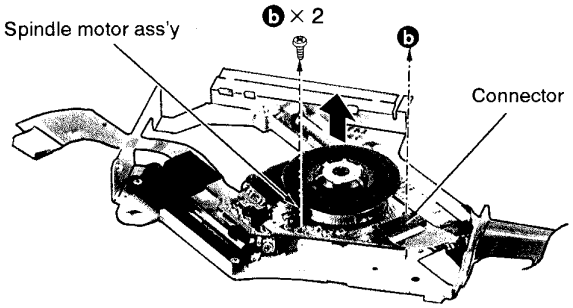
Step 3 Release the hook of traverse deck.

Step 4 Release the cam slot of traverse deck from the clamp rack plate shaft.



Step 5 Release the traverse deck shaft from the slot, and then remove the traverse deck.

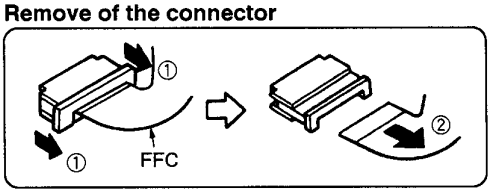
NOTE
Take care not to damage the FFC.



Step 6 Remove the 2 screws (ⓑ).

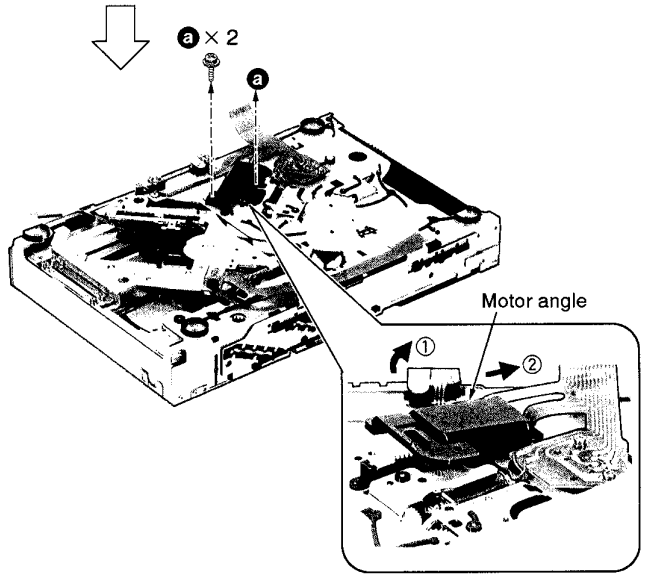
Step 7 Detach the connector, and then remove the spindle motor ass'y.

Remove of the connector



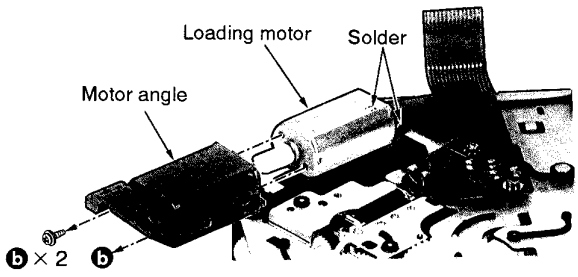
Replacement for the loading motor.

Follow the items (Step 1 ~ Step 5) of main P.C.B. checking. (See page 5.)



Step 1 Remove the 2 screws (ⓐ).

Step 2 Lift the motor angle in the direction of arrow ①, and then remove it with pushing in the direction of arrow ②.



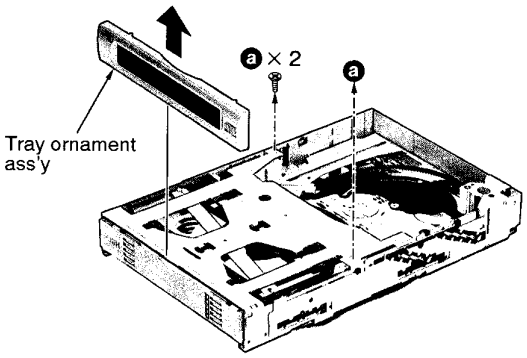
Step 3 Remove the 2 screws (ⓑ).

Step 4 Remove the motor angle.

Step 5 Unsolder the motor terminals (2 points).

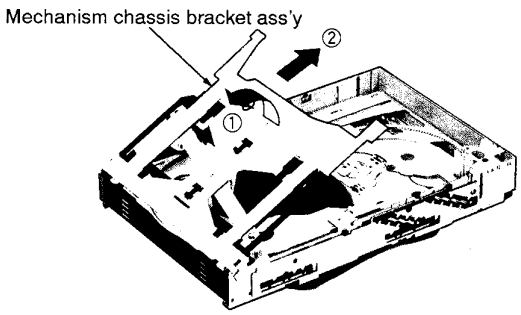
■ Loading unit component disassembly/reassembly

Loading unit component disassembly

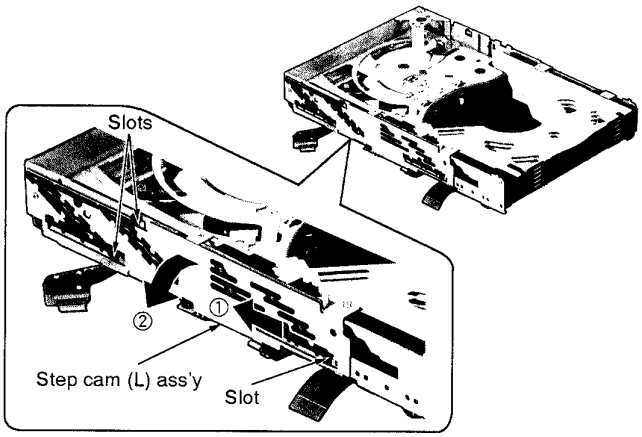


Step 1 Remove the tray ornament ass'y in the direction of arrow.

Step 2 Remove the 2 screws (ⓐ).

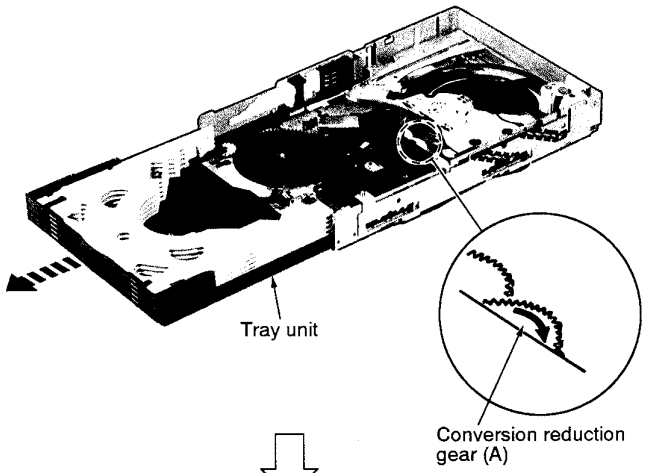


Step 3 Lift the mechanism chassis bracket ass'y in the direction of arrow ①, and them remove it in the direction of arrow ②.



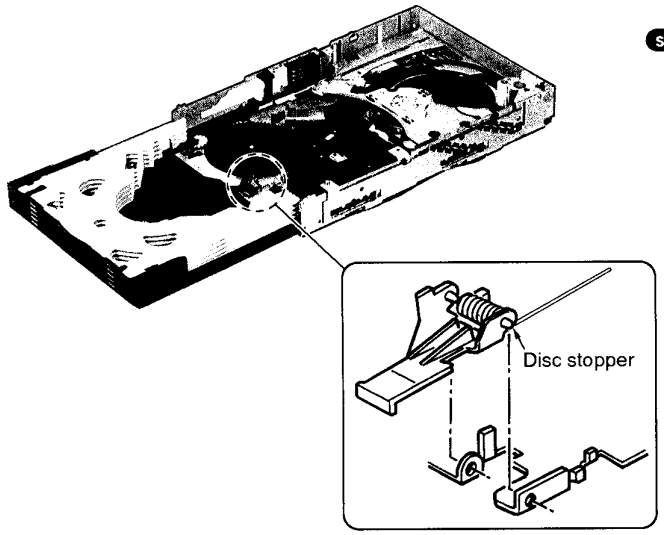
Step 4 Move the step cam (L) ass'y in the direction of arrow ①, and then align it with the slots.

Step 5 Remove the step cam (L) ass'y in the direction of arrow ②.

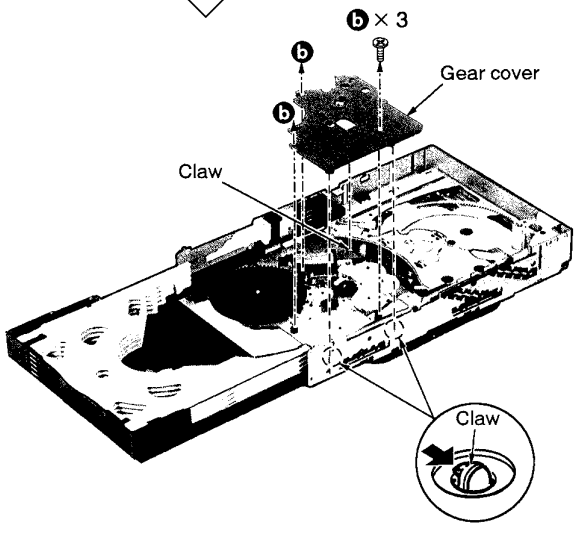


Step 6 Rotate the conversion reduction gear (A) in the direction of arrow (clockwise).

Step 7 Slide the tray base toward the front. then, pull the tray unit fully.

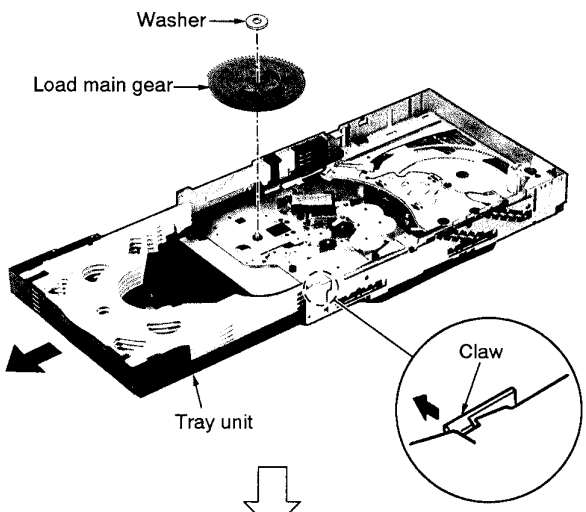


Step 8 Remove the disc stopper.



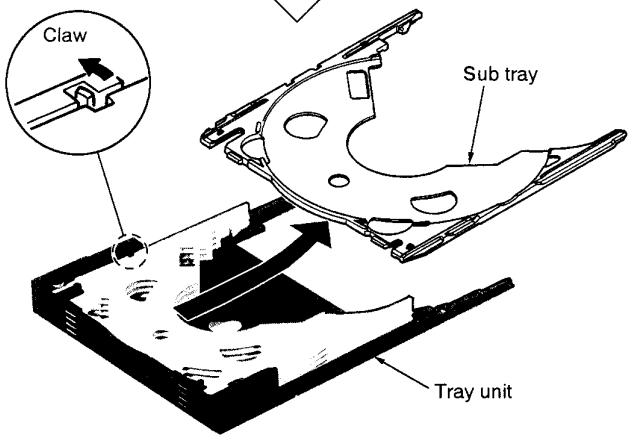
Step 9 Remove the 3 screws (ⓑ).

Step 10 Release the 3 claws, and then remove the gear cover.



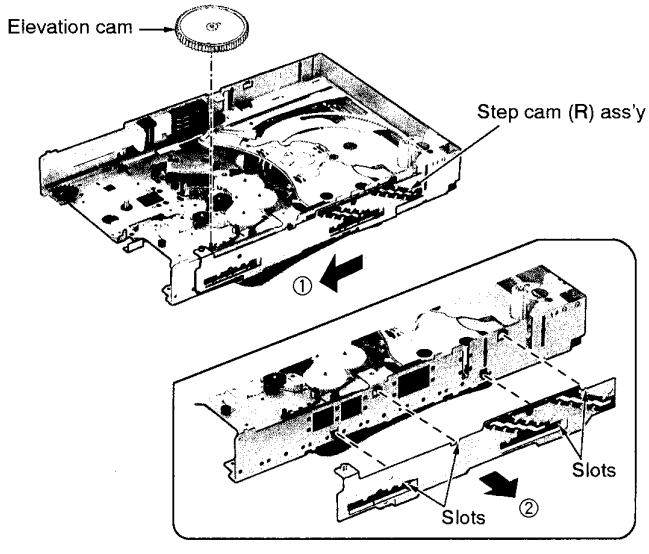
Step 11 Remove the washer and load main gear.

Step 12 Release the 1 claw, and then pull the tray unit.



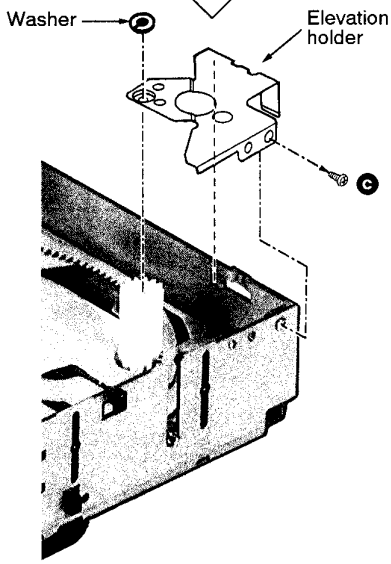
Step 13 With pressing the claw in the direction of arrow, pull the sub tray one by one.

- Tray base has 5 sub trays. When mounting the sub tray to the tray unit, the mounting order is not cared.



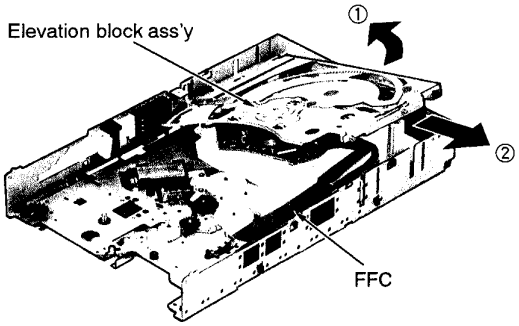
Step 14 Remove the elevation cam.

Step 15 Slide the step cam (R) ass'y in the direction of arrow ① and align it with the slots, then remove the step cam (R) ass'y in the direction of arrow ②.



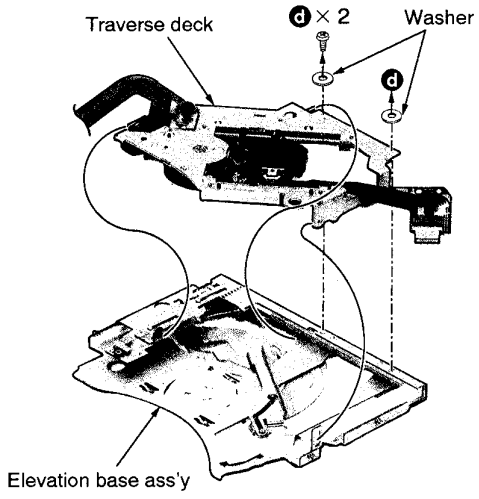
Step 16 Remove the 1 screw (c).

Step 17 Remove the washer and the elevation gear holder.



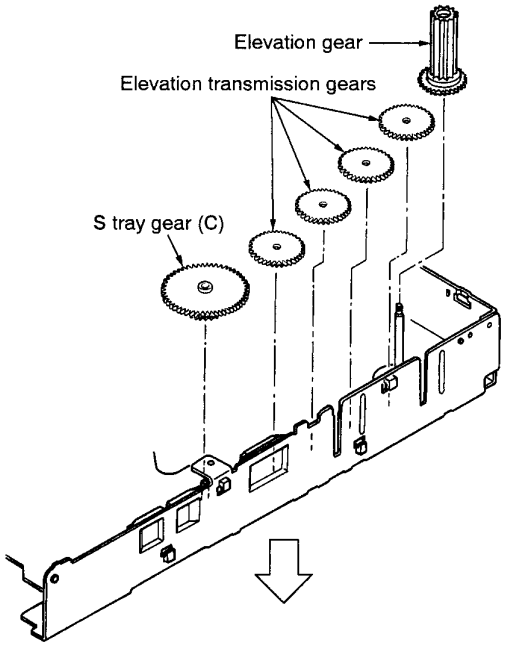
Step 18 Lift the elevation block ass'y in the direction of arrow ①, and then remove it in the direction of arrow ②.

NOTE
Take care not to bend or damage the FFC.



Step 19 Remove the 2 screws (d) and 2 washers.

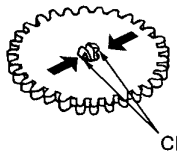
Step 20 Remove the traverse deck.



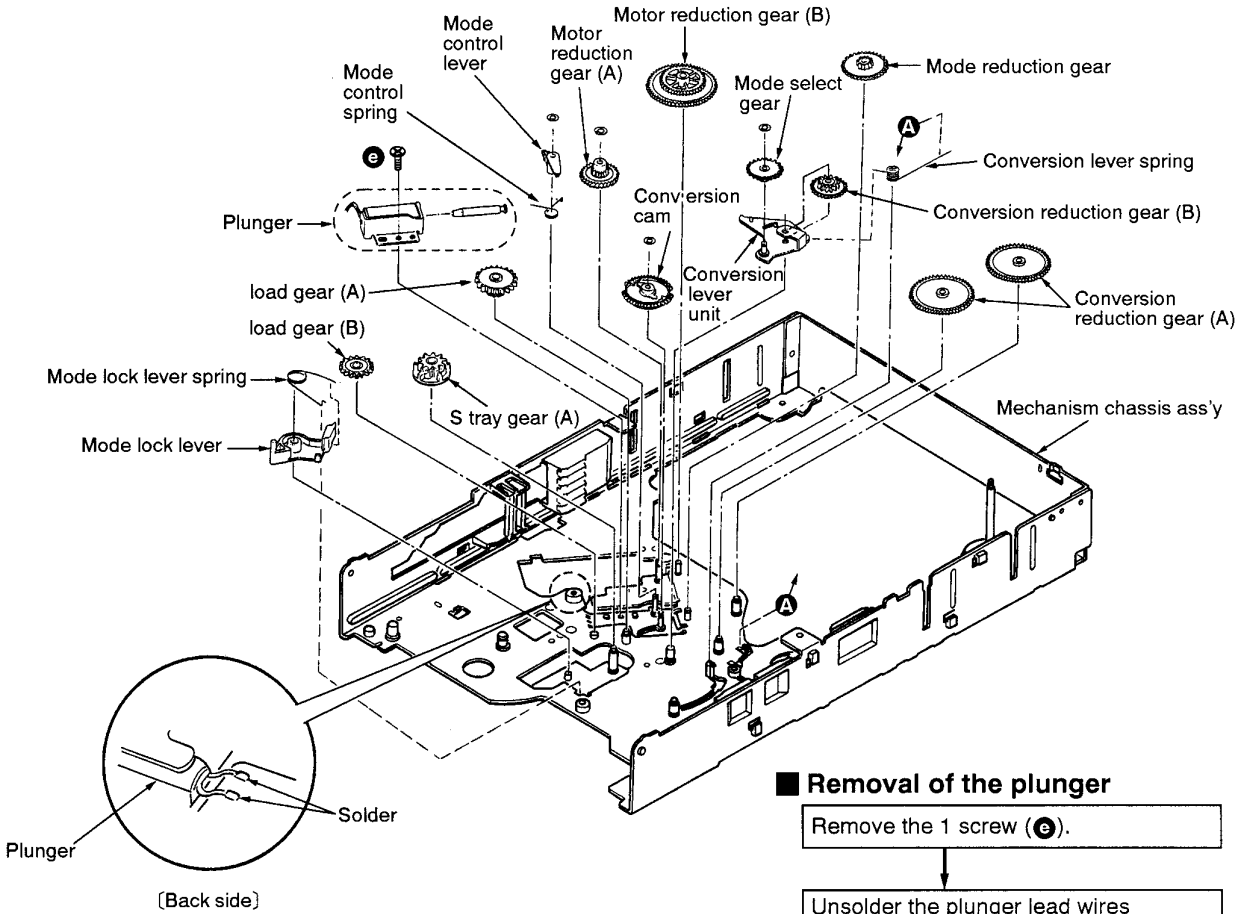
Step 21 Remove the elevation gear, elevation transmission gear and S tray gear (C).

■ Removal of the elevation transmission gear

• Release the 2 claws.



Step 22 Remove the gears, lever, spring and etc, as shown below.

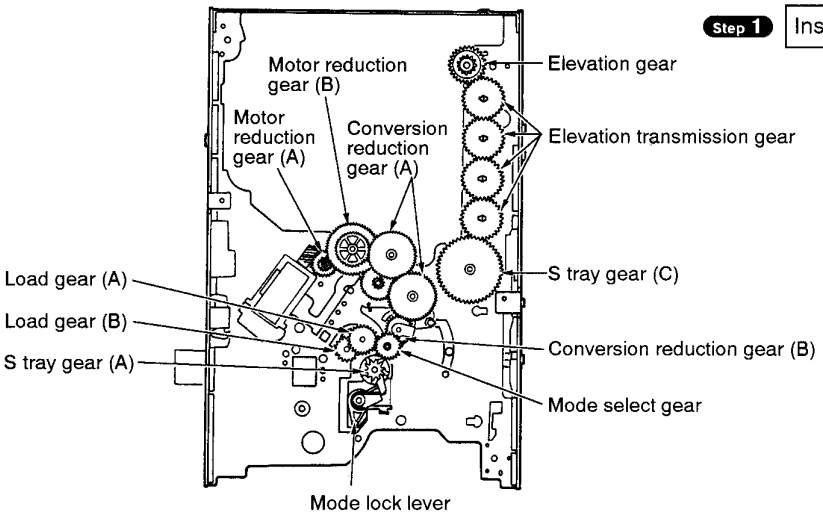


■ Removal of the plunger

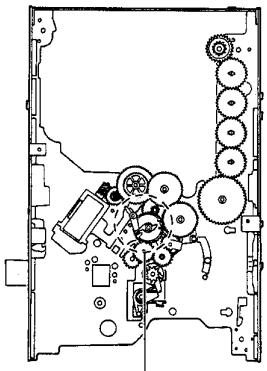
Remove the 1 screw (e).

Unsolder the plunger lead wires (2 points) on the back side of mechanism chassis ass'y.

Loading unit component reassembly.



Step 1 Install the gears and levers as shown left.



Step 2 Install the mode control spring to the boss A, and then align the portion ⓐ of spring with the slot. (Refer to figure 1)

Step 3 Install the conversion cam to the boss B, and then install the washer. (Refer to figure 1)

NOTE

Set the conversion cam so that the round slot is located at direction A. (Refer to figure 2)

Step 4 Install the mode control lever to the boss A. (Refer to figure 1)

NOTE

Align the portion ⓑ of mode control spring with the hook of mode control lever. (Refer to figure 1)

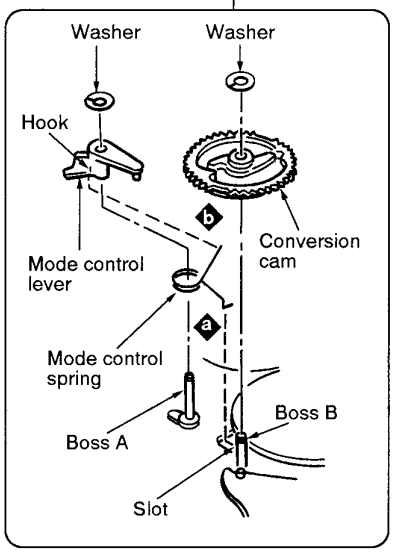


Figure 1

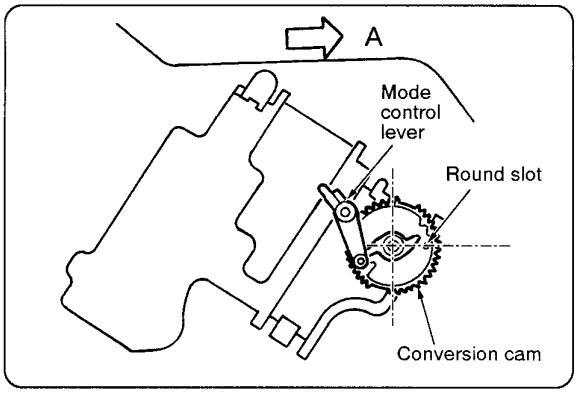
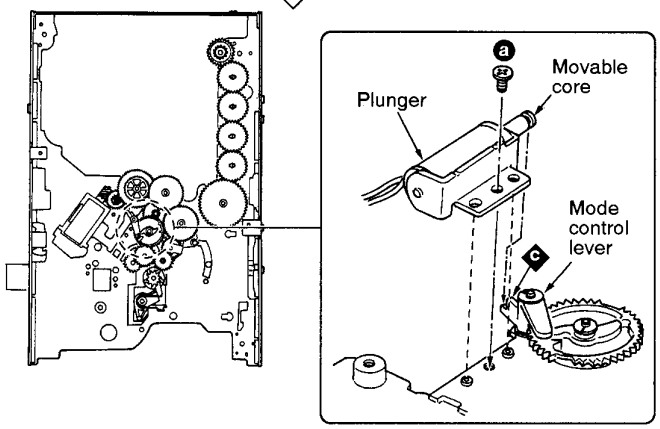
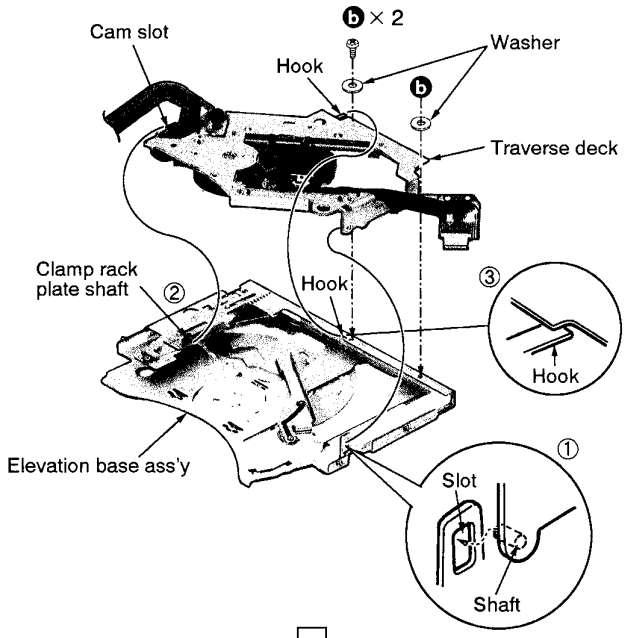


Figure 2



Step 5 Align the bent of movable core with the portion ◆c of mode control lever.

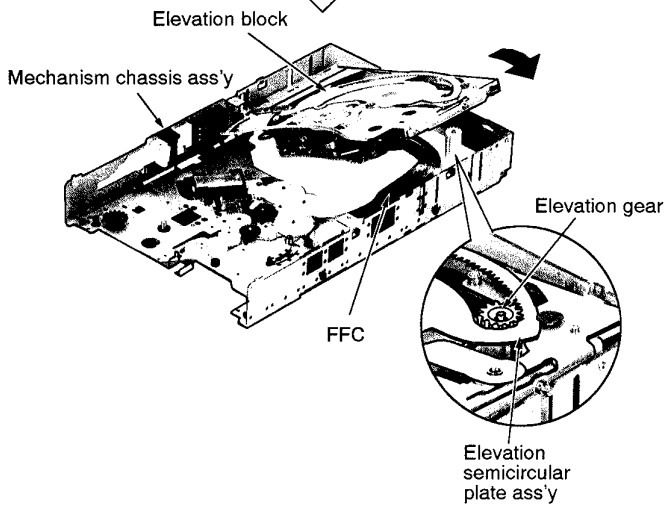
Step 6 Install the plunger, and then tighten the screw (ⓐ).



Step 7 Install the traverse deck to the elevation base ass'y.

① Align the shaft of traverse deck with the slot.
② Align the cam slot of traverse deck with the clamp rack plate shaft.
③ Align the hook of traverse deck with the lower side of slot.

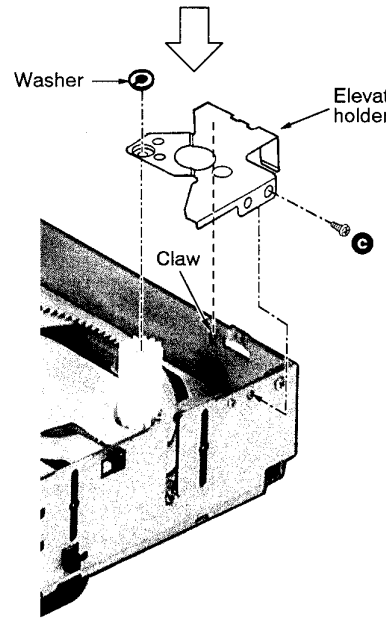
Step 8 Fix with 2 screws (ⓑ) and 2 washers.



Step 9 Install the elevation block to the mechanism chassis ass'y.

NOTE
When inserting, take care to interfere the elevation semicircular plate ass'y with the elevation gear. (Engage the tooth of gear.)

NOTE
Do not pinch the FFC.



Step 10 Install the elevation gear holder.
• Assure the claw is latched.

Step 11 Install the washer, and then tighten screw (C).

• Phase Adjustment

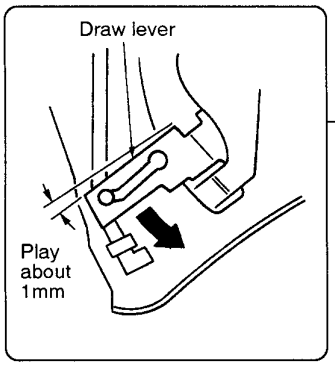
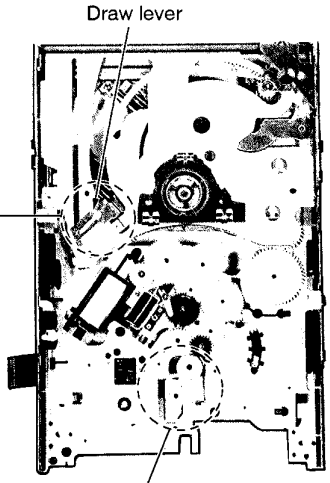


Figure 1



1. Locate the draw lever in the direction of arrow. (Refer to figure 1.)
2. Engage the claw of mode lock lever with the tooth of S tray gear (A). (Refer to figure 2.)
3. After engagement, the play of draw lever must be less then 1mm.
4. If the play is more than 1mm, unlock the draw lever. Then, rotate the S tray gear (A) in the direction of arrow with lifting a small amount and engage the mode lock lever with the block. (Refer to figure 2.)
5. Depending on the engagement above, select the appropriate position.

NOTE
Take care to engage the tooth of gear. (Refer to figure 3.)

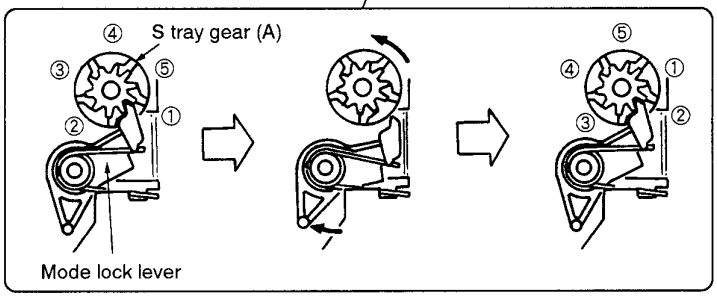


Figure 2

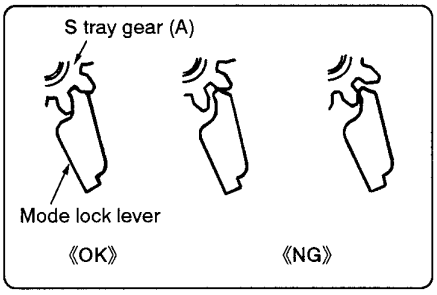
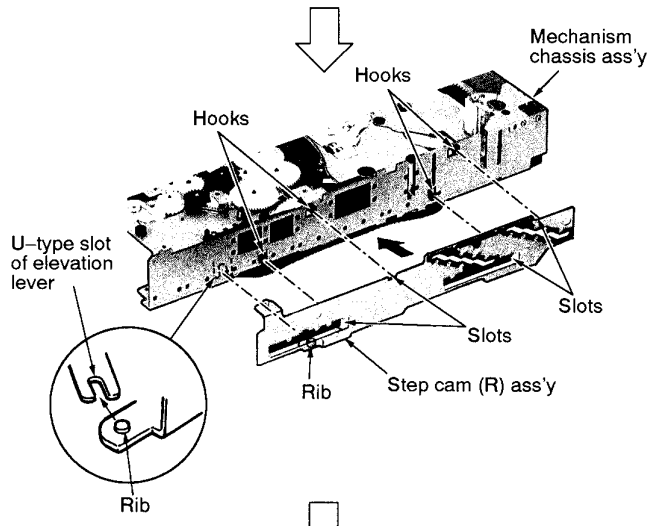


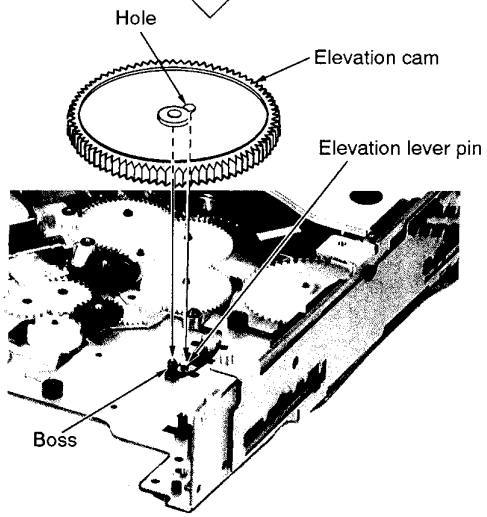
Figure 3



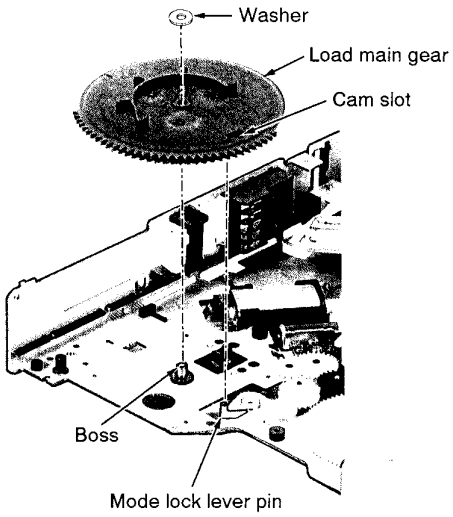
Step 12 Align the slots of step cam (R) ass'y with the hooks of mechanism chassis ass'y, and then install the step cam (R) ass'y.

NOTE

The rib of step cam (R) ass'y should be inserted in U–type slot of elevation lever.



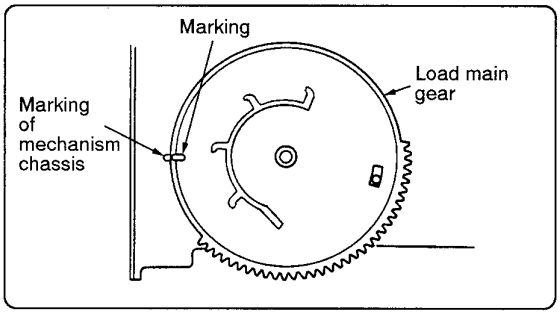
Step 13 Align the hole of elevation cam with the elevation lever pin, and then insert the elevation cam into the boss.

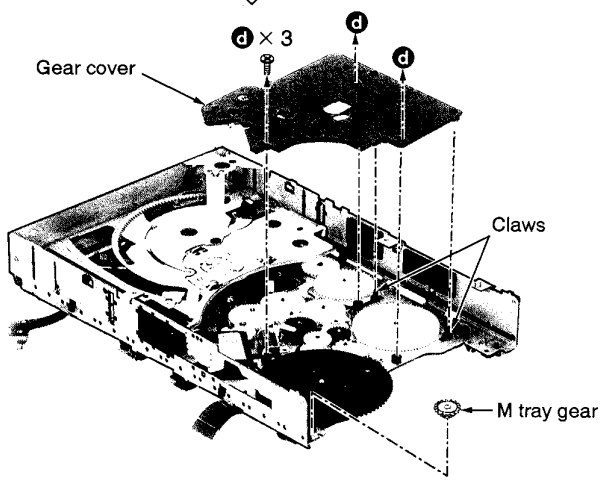


Step 14 Align the cam slot of load main gear with the pin of mode lock lever, and then insert the load main gear into the boss.

Step 15 Install the washer.

◉ Align the marking of load main gear with that of mechanism chassis. (Refer to figure below.)





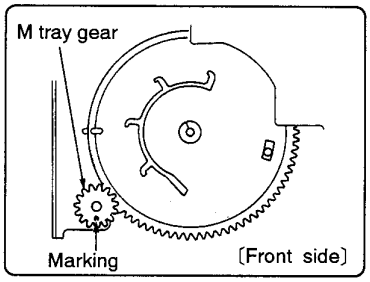
Step 16 Install the gear cover.

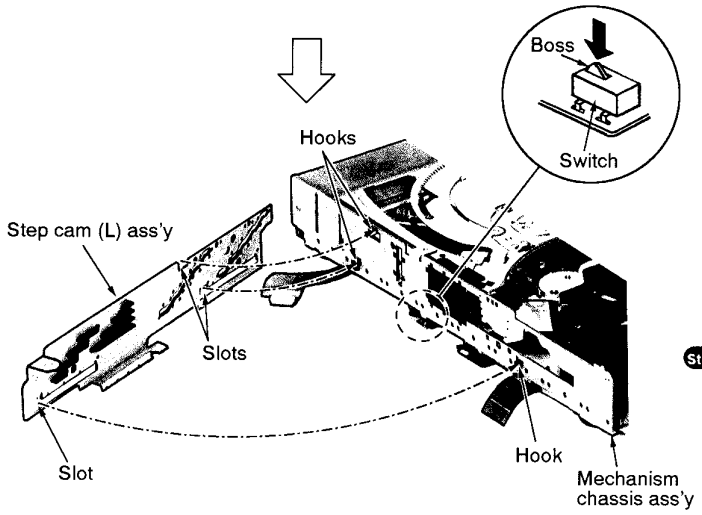
NOTE
The claws (2 points) must be latched.

Step 17 Tighten the screws (d).

Step 18 Install the M tray gear.

NOTE
Mate the marking toward the front side.
(Refer to figure below.)

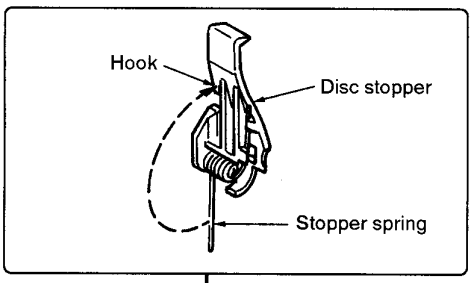


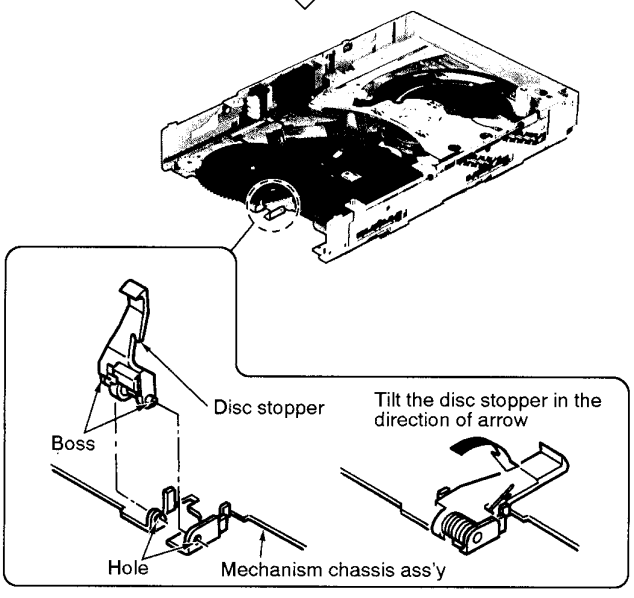


Step 19 Align the slots of step cam (L) ass'y with the hooks of mechanism chassis ass'y, and then install the step cam (L) ass'y.

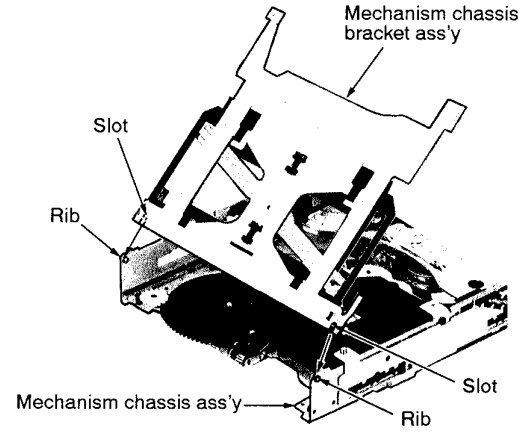
NOTE
When installing the step cam (L) ass'y to the mechanism chassis ass'y, install it with pressing the switch boss in the direction of arrow.

Step 20 Temporarily install the stopper spring on the hook of disc stopper.

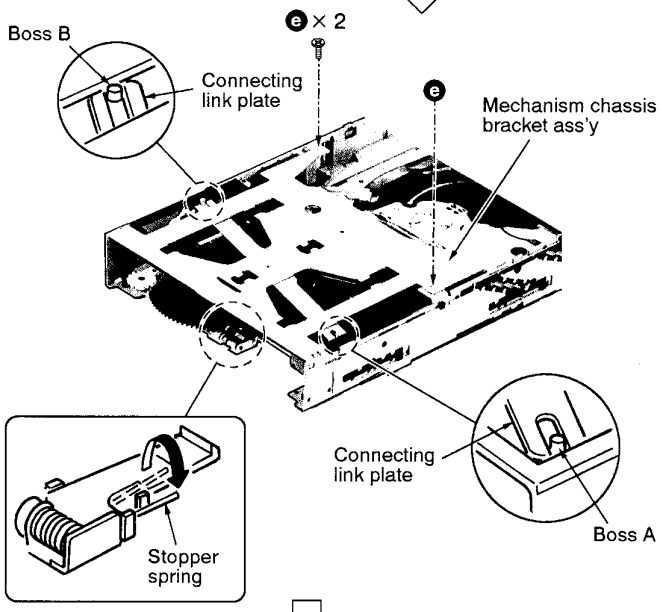




Step 21 Align the boss of disc stopper with the hole of mechanism chassis ass'y.



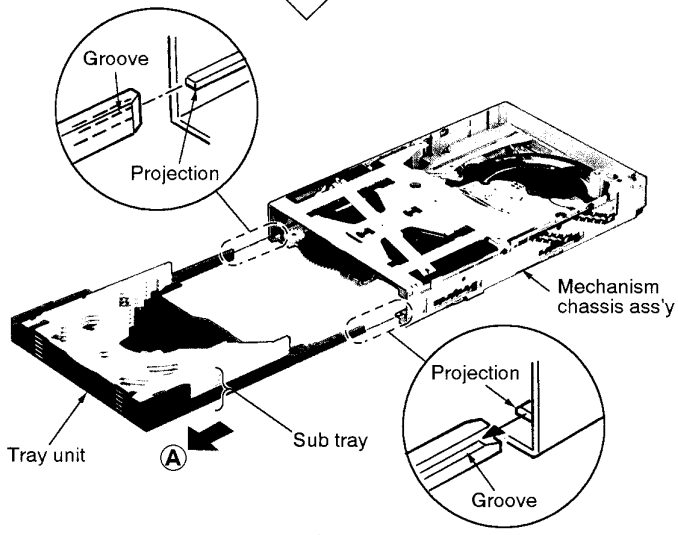
Step 22 Install the slot of mechanism chassis bracket ass'y into the rib of mechanism chassis ass'y, and then install the mechanism chassis bracket ass'y.



Step 23 Align the connecting link plate with the boss A of step cam (R) ass'y and boss B of step cam (L) ass'y.

Step 24 Tighten the screws (e).

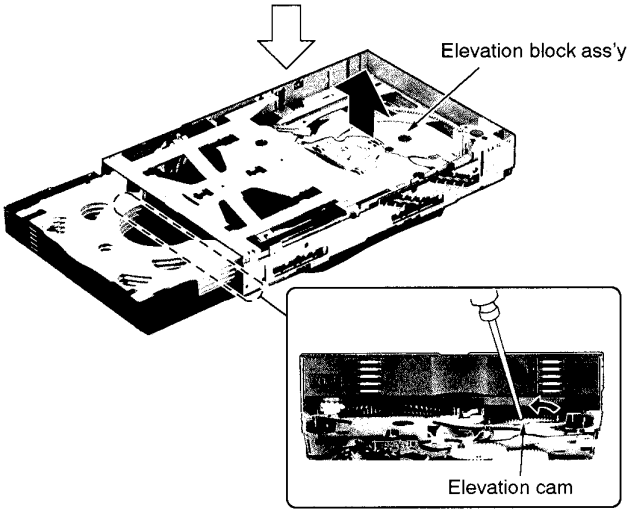
Step 25 Secure the stopper spring temporarily installed with disc stopper.



Step 26 Align the groove of tray unit with the projection of mechanism chassis ass'y, and then insert the tray unit.

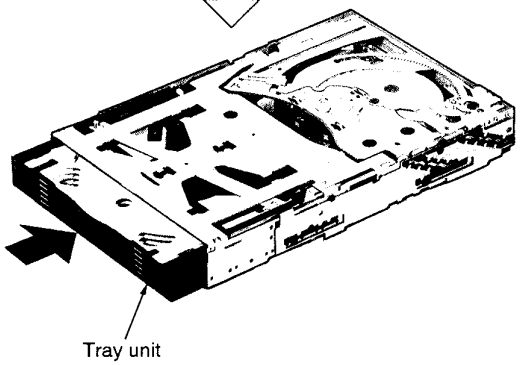
NOTE

After installing the tray unit, make sure that the 5 sub tray bases are located in the direction of arrow Ⓐ.



〔Bottom side〕

Step 27 Rotate the elevation cam in the direction of arrow (counterclockwise), and then rise the elevation block ass'y.

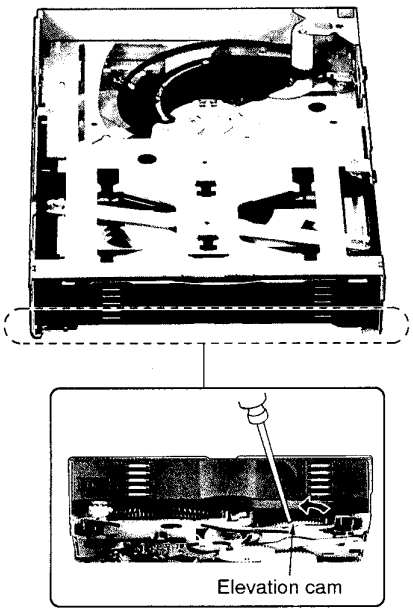


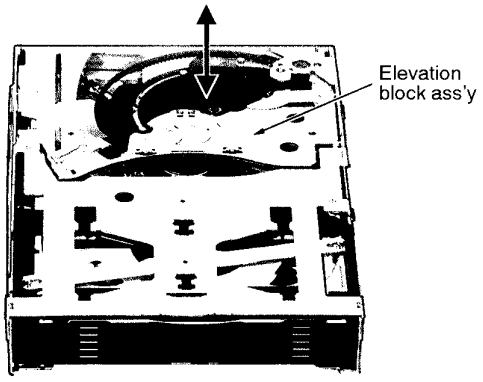
Step 28 Push the tray unit.

Loading components assembling complete

Manual operation check of loading components.

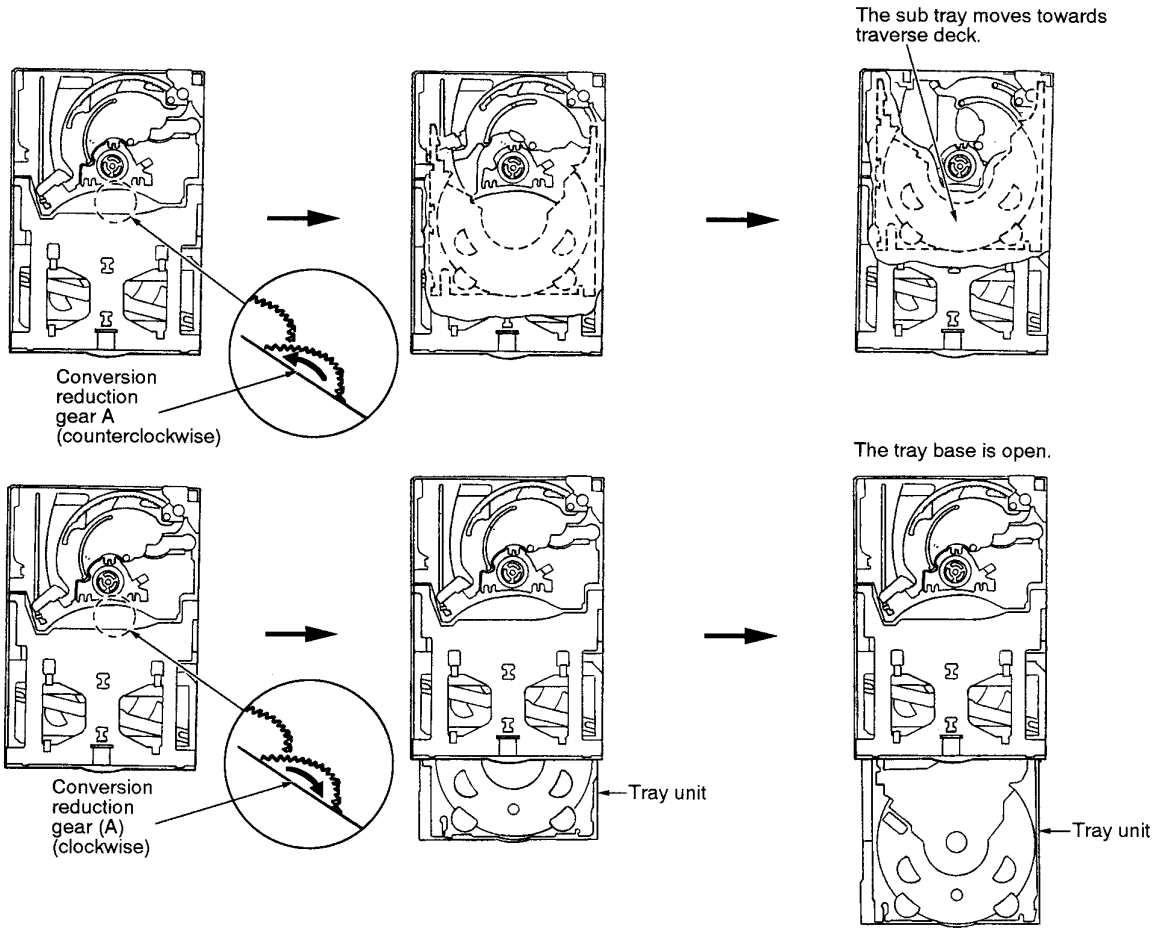
1. Elevation block operation.





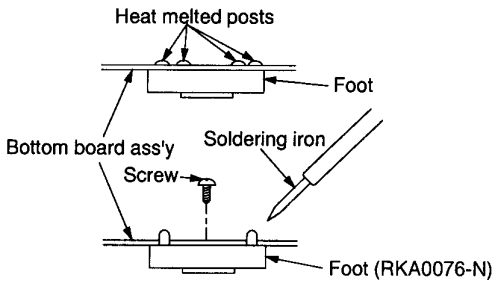
Elevation cam	Elevation block ass'y
Rotate counterclockwise : Up ward Rotate clockwise : Down ward	

2. Main tray and sub tray operation


The sub tray moves towards traverse deck.
Conversion reduction gear A (counterclockwise)
The tray base is open.
Conversion reduction gear (A) (clockwise)
Tray unit
Tray unit

■ Replacement of the Foot

1. Remove the 4 heat melted posts on the Bottom board ass'y with a pair of nippers or similar tool.
2. To replace the foot (RKA0076-N) on the Bottom board ass'y melt the 4 posts with a soldering iron or install it with a screw (XTB3+6J).

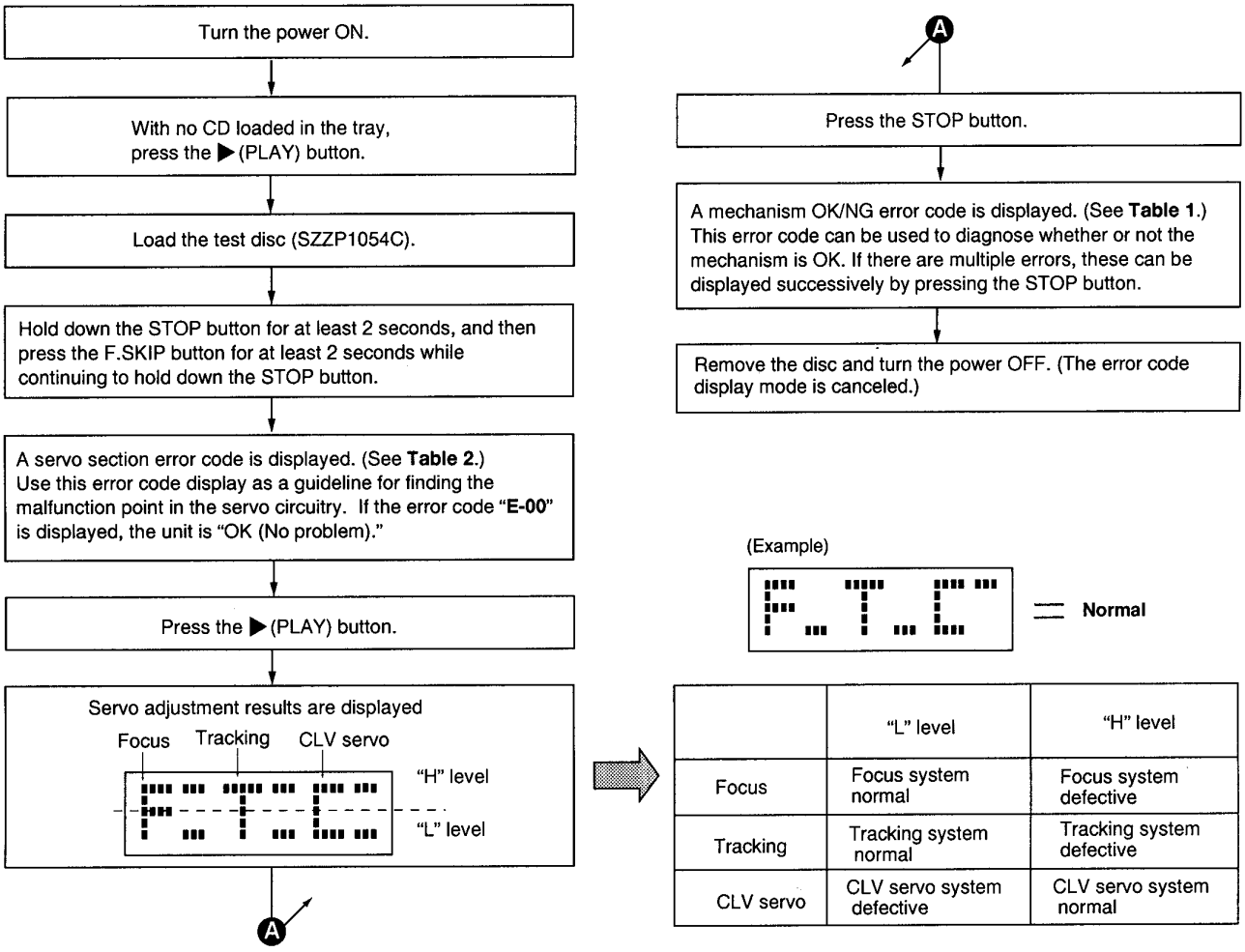


■Error Code Display and Servo Adjustment Function

This unit has an error code display function, so that if the unit operates incorrectly, the fault is displayed using an error code on the FL display of the tuner (ST-HD70). It also has a servo adjustment function for displaying the status of servo system functions (focus, tracking, CLV) on the tuner's FL display.
The system control IC and FL display are part of the tuner so make sure the system has been connected properly before using these functions. (This unit can be operated independently, although the error code display and servo adjustment functions cannot be used.)
Use these two functions for guidance during fault diagnosis and repair.

Note: Check beforehand for scratching or soiling of the test disc (SZZP1054C), and soiling or other problems with the optical pickup lens.

• Error code display and adjustment procedure


Turn the power ON.
With no CD loaded in the tray, press the ▶ (PLAY) button.
Load the test disc (SZZP1054C).
Hold down the STOP button for at least 2 seconds, and then press the F.SKIP button for at least 2 seconds while continuing to hold down the STOP button.
A servo section error code is displayed. (See Table 2.) Use this error code display as a guideline for finding the malfunction point in the servo circuitry. If the error code "E-00" is displayed, the unit is "OK (No problem)."
Press the ▶ (PLAY) button.
Servo adjustment results are displayed
Focus
Tracking
CLV servo
"H" level
"L" level
A
A
Press the STOP button.
A mechanism OK/NG error code is displayed. (See Table 1.) This error code can be used to diagnose whether or not the mechanism is OK. If there are multiple errors, these can be displayed successively by pressing the STOP button.
Remove the disc and turn the power OFF. (The error code display mode is canceled.)
(Example)
Normal

	"L" level	"H" level
Focus	Focus system normal	Focus system defective
Tracking	Tracking system normal	Tracking system defective
CLV servo	CLV servo system defective	CLV servo system normal

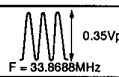
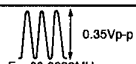
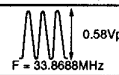
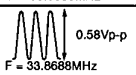
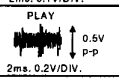
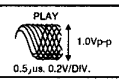
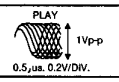
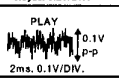
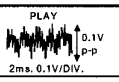
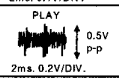
• Table 1

FL display	Symptom	Cause
H - 15	When CD tray opens, it closes by itself.	Disc tray "Open" detection sensor (Z3) fault.
H - 16	When CD tray closes, it opens by itself	Disc tray "Closed" detection sensor (Z2) fault.
F - 15	Does not play, even when CD play button is pressed.	Pickup rest position detection switch fault.
F - 17	The tray opens.	Traverse deck DOWN detection switch (S1) fault.
F - 26	Does not move even when ▶ (PLAY) is pressed.	System control or servo processor IC (IC401, IC501) fault.
F-27	The selected disc tray does not open.	Positioning detection sensor (Z1) fault.
F-30	The unit try to play without a disc.	Disc IN/OUT detection sensor (Q691, D691) fault.

●Table 2

※ The unit is satisfactory if the error code is **E - 00** of **E - 02**

※ Before testing, check that the test disc is free of scratches and optical pickup is clean.

FL error code display	Symptom	Probable cause	Signal to check		Normal voltage and waveform values	
			Signal name	Location	PLAY	STOP
E - 01	Focus and tracking offset adjustments not completed in the specified time period.	1. Clocks X1 and X2, power supply V_{DD} and reset/RST, all on IC401. 2. MDATA, MCLK, MLD and SENSE signal to/from mechanism controller.	MDATA	IC401 ⑧ pin		0V
			MCLK	IC401 ⑦ pin		4.9V
			MLD	IC401 ⑨ pin		4.9V
			SENSE	IC401 ⑩ pin	—	—
			/RST	IC401 ⑱ pin	4.8V	4.8V
			X1	IC401 ⑬ pin		
			X2	IC401 ⑭ pin		
E - 03 E - 05 E - 07 E - 09 E - 0B E - 0D E - 0F	Disc play unstable.	1. Scratches or contaminants on disc surface. 2. Focus and tracking servo circuits (check waveforms, voltages, and part values.) 3. Spindle driver circuit. 4. Optical pickup.	FE	IC401 ㊶ pin		2.4V
			TE	IC401 ㊷ pin		2.4V
			FOD	IC401 ㉞ pin	2.4V	2.4V
			TRD	IC401 ㉜ pin	2.4V	2.4V
			KICK	IC401 ㉛ pin	2.4V	2.4V
			/FLOCK	IC401 ⑪ pin	—	—
			/RF DET	IC401 ㊼ pin	0V	4.8V
			RF	IC401 ㊹ pin		2.4V
			STAT	IC401 ⑰ pin	4.8V	0V
E - 04 E - 06 E - 0C E - 0E	Best "Eye" (PD Balance) adjustment not completed in the specified time period.	1. Scratches or contaminants on disc surface. 2. Focus and Tracking servo circuit (check waveforms, voltages, and part values.) 3. Optical pickup.	FBAL	IC401 ㊲ pin	2.4V	2.4V
			RF	IC401 ㊹ pin		2.4V
			FE	IC401 ㊶ pin		2.4V
			/TLOCK	IC401 ⑫ pin	—	—
			OFT	IC401 ㊺ pin	0V	0V
E - 08 E - 0A	Focus or Tracking gain adjustment not completed in the specified time period.	1. Scratches or contaminants on disc surface. 2. Focus and Tracking servo circuit (check waveforms, voltages, and part values.) 3. Optical pickup.	FE	IC401 ㊶ pin		2.4V
			TE	IC401 ㊷ pin		2.4V
			/TLOCK	IC401 ⑫ pin	—	—
			OFT	IC401 ㊺ pin	0V	0V

■ Measurements and Adjustments

Cautions:
- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.)
  With the unit turned "on" , laser radiation is emitted from the pickup lens.
- Avoid exposure to the laser beam, especially when performing adjustments.

This unit SL-HD70 is designed to operate on power supplied from the Amplifier SE-HD70 through the Tuner ST-HD70.
When connecting the unit to other system components, do not connect to the Amplifier SE-HD70 directly. Be sure to connect this unit through the Tuner ST-HD70.
When operating the unit SL-HD70 alone for testing and servicing, without having power supplied from the Amplifier SE-HD70, use the following method.

Power Supply to This Unit alone

Apply 11V AC power to the section between **AC IN** of the coil (L101) and the jumper (J253) **GND** as well as the section between **AC IN** of the coil (L102) and the jumper (J101) **GND**. **(Shown in Fig. 1)**

To Check Signals

Connect the oscilloscope or the speaker with built-in amplifier to the section between LINE OUT (Lch) of the resistor R127 and the **GND** point of the jumper (J101) as well as the section between LINE OUT (R ch) of the resistor R126 and the **GND** point of the jumper (J253) and check if the signals are outputting from this unit. **(Shown in Fig. 1)**

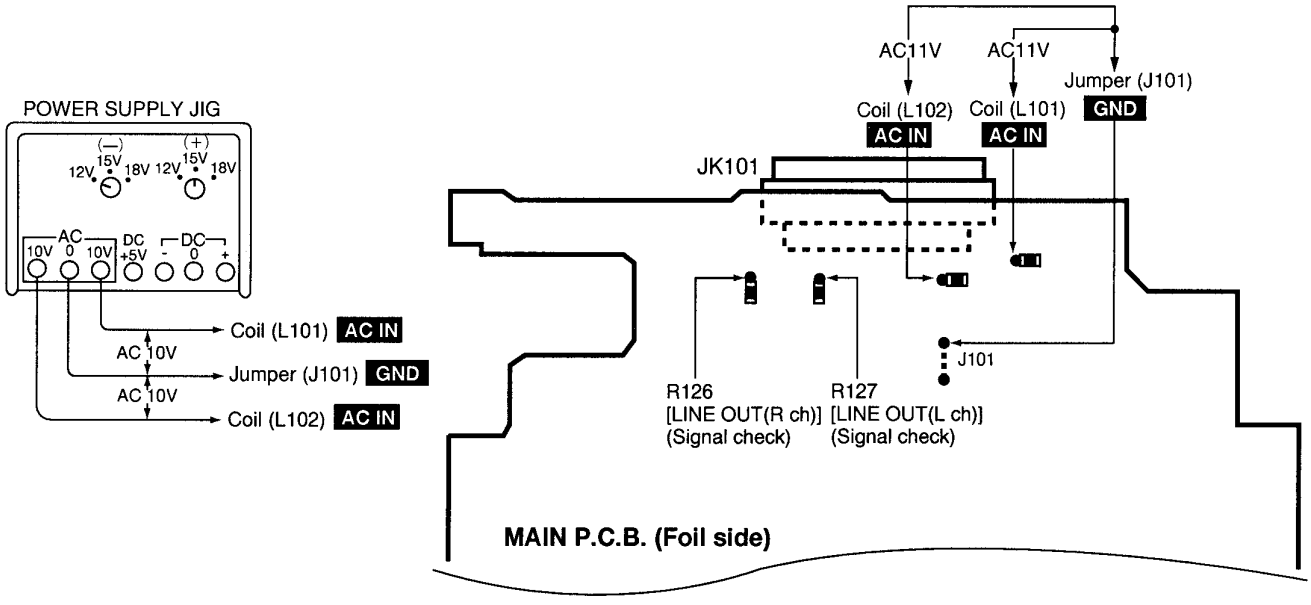
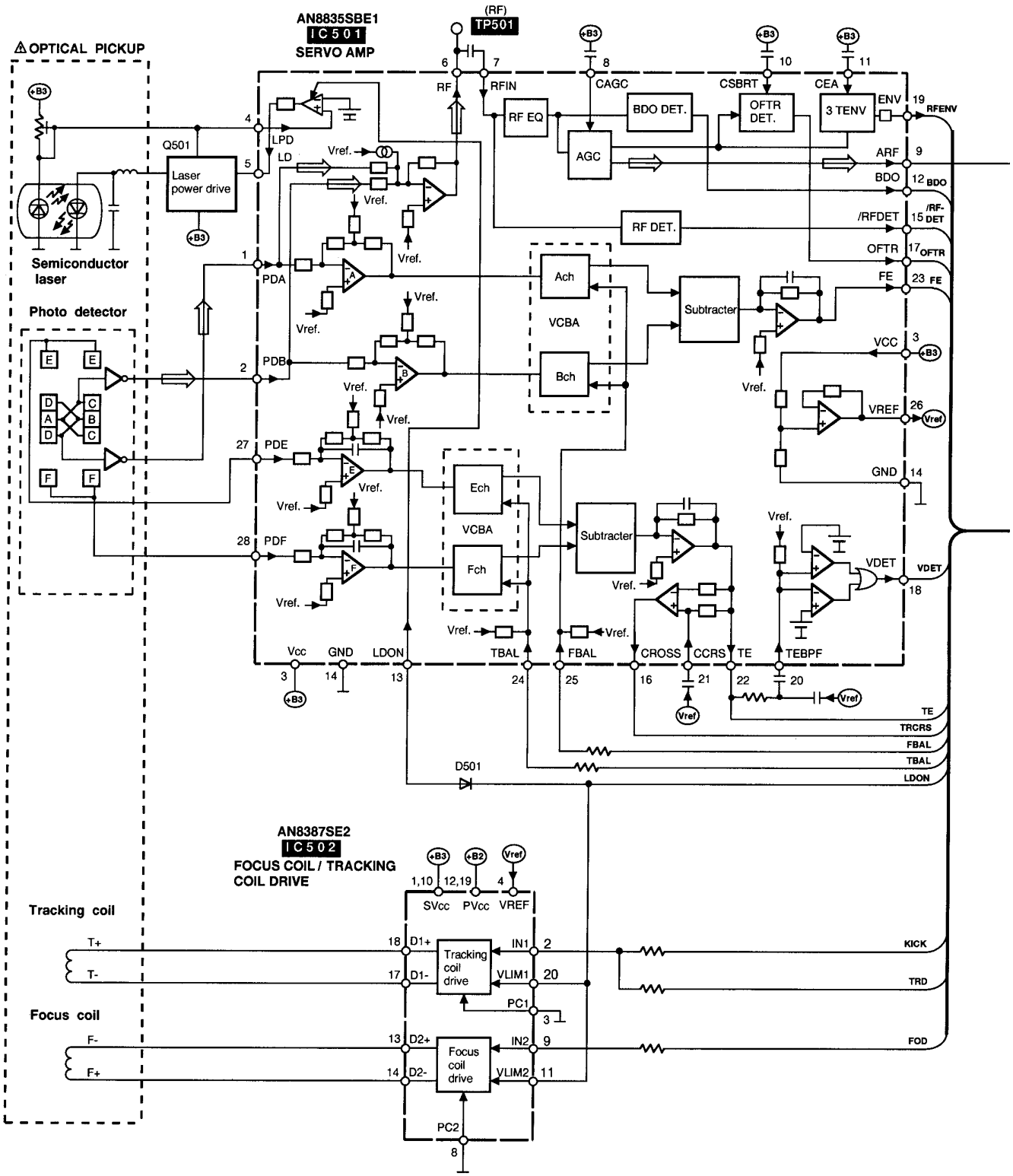
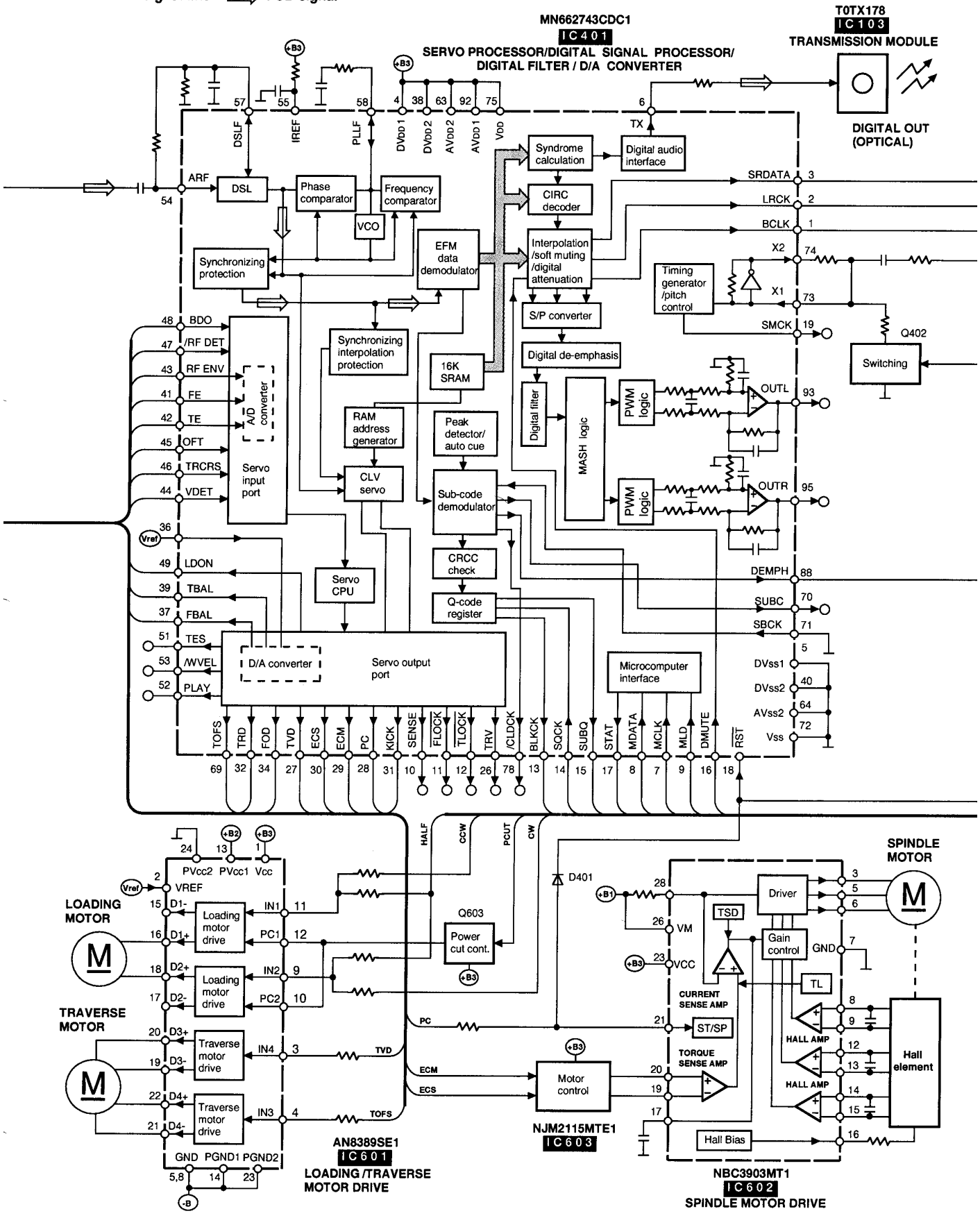


Fig. 1

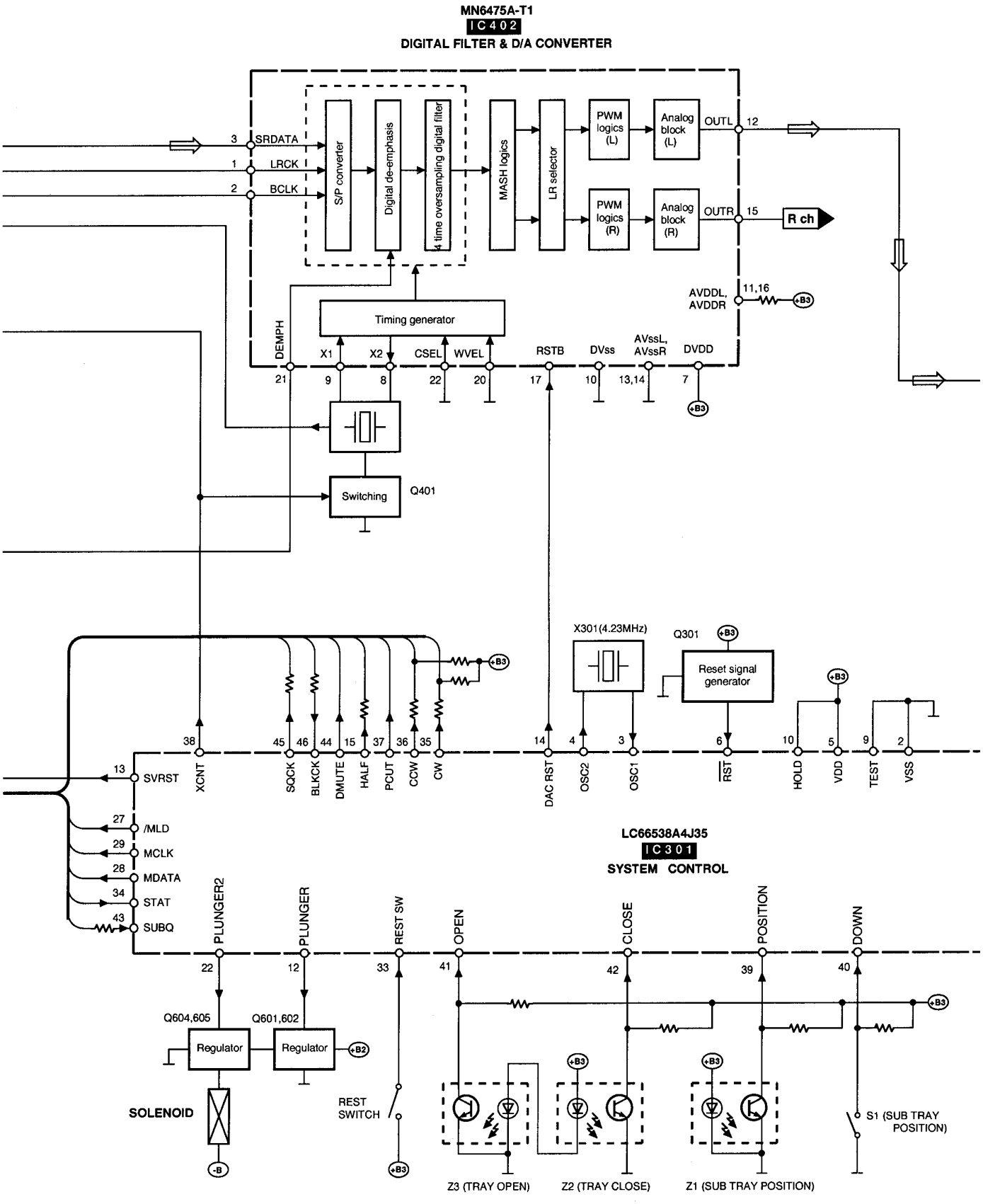
■ Block Diagram

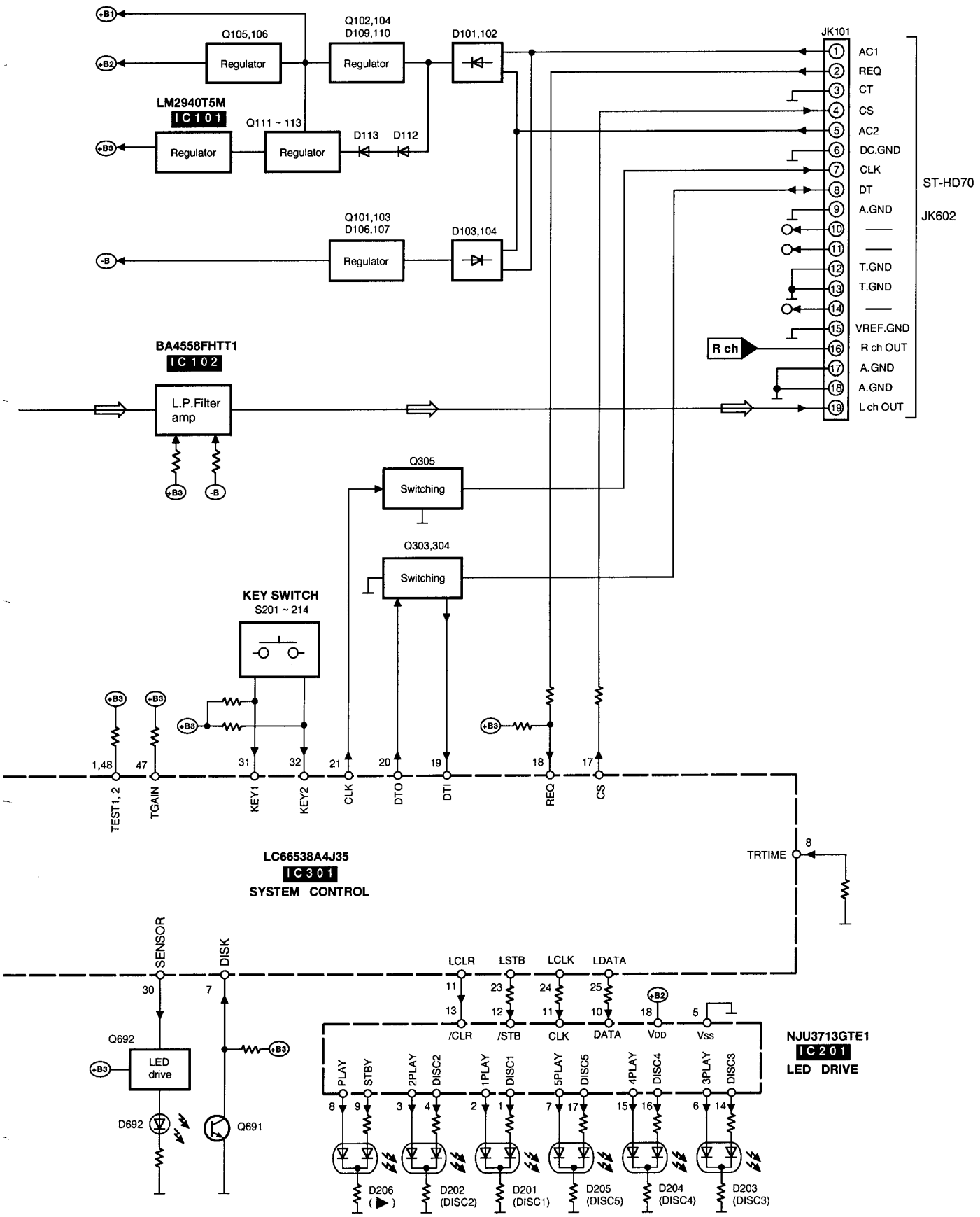


• Signal line ⇨ : CD signal

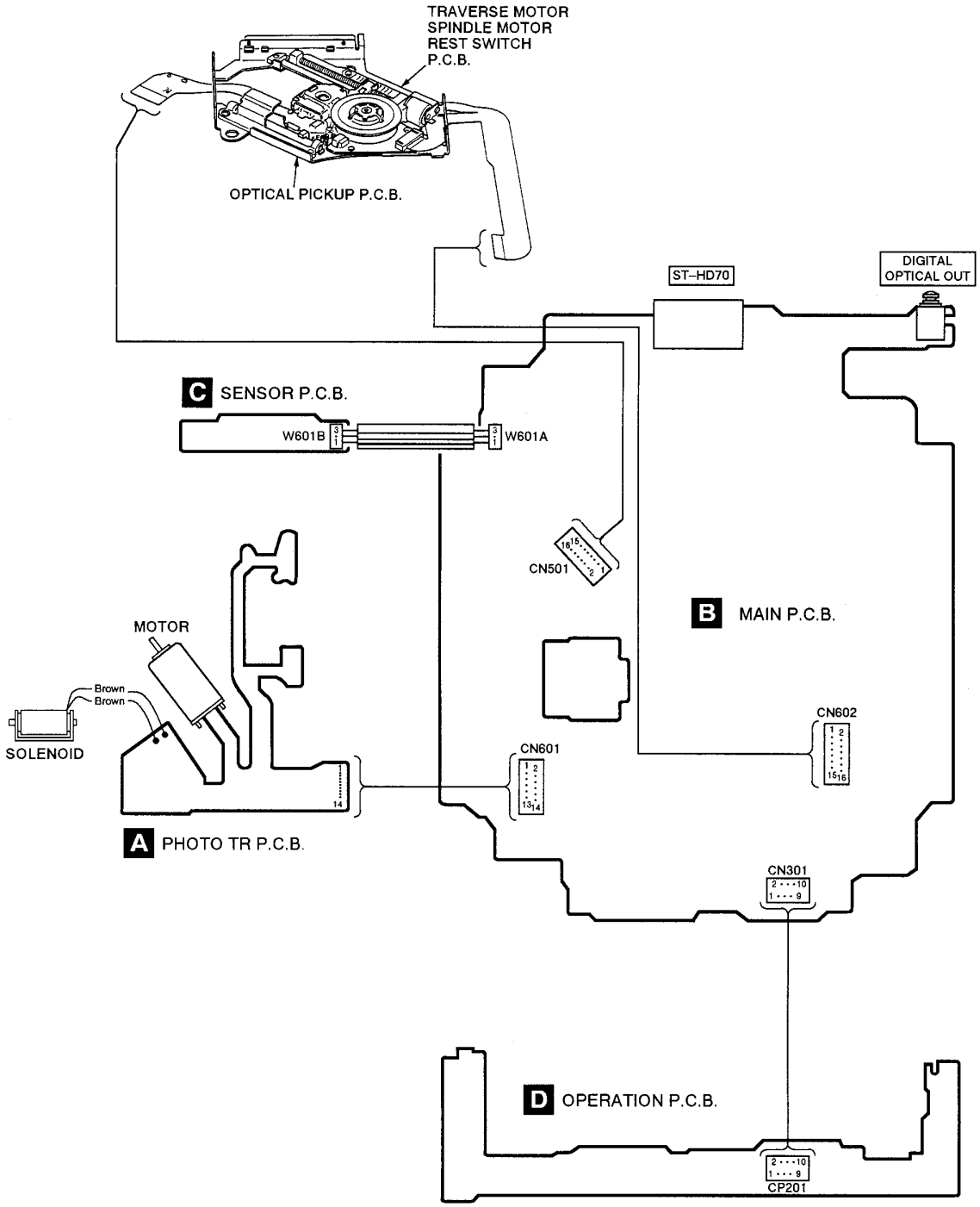


● Signal line ⇨ : CD signal




+B1
+B2
+B3
-B
Q105,106
Regulator
Q102,104
D109,110
Regulator
D101,102
LM2940T5M
IC101
Q111 ~ 113
Regulator
Regulator
D113
D112
Q101,103
D106,107
Regulator
D103,104
JK101
1 AC1
2 REQ
3 CT
4 CS
5 AC2
6 DC.GND
7 CLK
8 DT
9 A.GND
10 ——
11 ——
12 T.GND
13 T.GND
14 ——
15 VREF.GND
16 R ch OUT
17 A.GND
18 A.GND
19 L ch OUT
ST-HD70
JK602
R ch
BA4558FHTT1
IC102
L.P.Filter amp
Q305
Switching
Q303,304
Switching
KEY SWITCH
S201 ~ 214
1,48 TEST1, 2
47 TGAIN
31 KEY1
32 KEY2
21 CLK
20 DTO
19 DTI
18 REQ
17 CS
LC66538A4J35
IC301
SYSTEM CONTROL
TRTIME
8
SENSOR
30
DISK
7
LCLR
LSTB
LCLK
LDATA
11
23
24
25
13
12
11
10
18
5
/CLR
/STB
CLK
DATA
VDD
Vss
Q692
LED drive
D692
Q691
NJU3713GTE1
IC201
LED DRIVE
PLAY
STBY
2PLAY
DISC2
1PLAY
DISC1
5PLAY
DISC5
4PLAY
DISC4
3PLAY
DISC3
8
9
3
4
2
1
7
17
15
16
6
14
D206 (▶)
D202 (DISC2)
D201 (DISC1)
D205 (DISC5)
D204 (DISC4)
D203 (DISC3)

■ Wiring Connection Diagram



■ Schematic Diagram (Parts list on pages 46～48.)

- This schematic diagram may be modified at any time with the development of new technology.

	Page
A PHOTO TR CIRCUIT	34
B MAIN CIRCUIT	34～37
C SENSOR CIRCUIT	34
D OPERATION CIRCUIT	36

Notes:

- **S1** : Mechanism position detect switch.
- **S201**: Disc select (DISC1) switch.
- **S202**: Disc select (DISC2) switch.
- **S203**: Disc select (DISC3) switch.
- **S204**: Disc select (DISC4) switch.
- **S205**: Disc select (DISC5) switch.
- **S206**: Disc tray open/close (▲ OPEN/CLOSE) switch.
- **S207**: Play (▶) switch.
- **S208**: Pause (❚❚) switch.
- **S209**: Stop (■) switch.
- **S210**: F. skip/ search (▶▶ / ▶▶❙) switch
- **S211**: R. skip/ search (❙◀◀ / ◀◀) switch.
- **S212**: AI edit switch (AI EDIT)
- **S213**: Repeat switch (REPEAT)
- **S214**: Random play switch (RANDOM)
- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

No mark: CD STOP
( ): CD play [1kHz, L+R, 0dB]

- Important safety notice:
  Components identified by ⚠ mark have special characteristics important for safety.
  Furthermore, special parts which have purpose of fire-retardant (resistors), high-quality sound (capacitors), low-nose (resistors), etc. are used. When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.
- The supply part number is described alone in the replacement parts.

Parts No.	Production Part No.	Supply Part No.
IC101	LM2940T5M	LM2940T5
IC603	NJM2115MTE1	NJM2115MT1

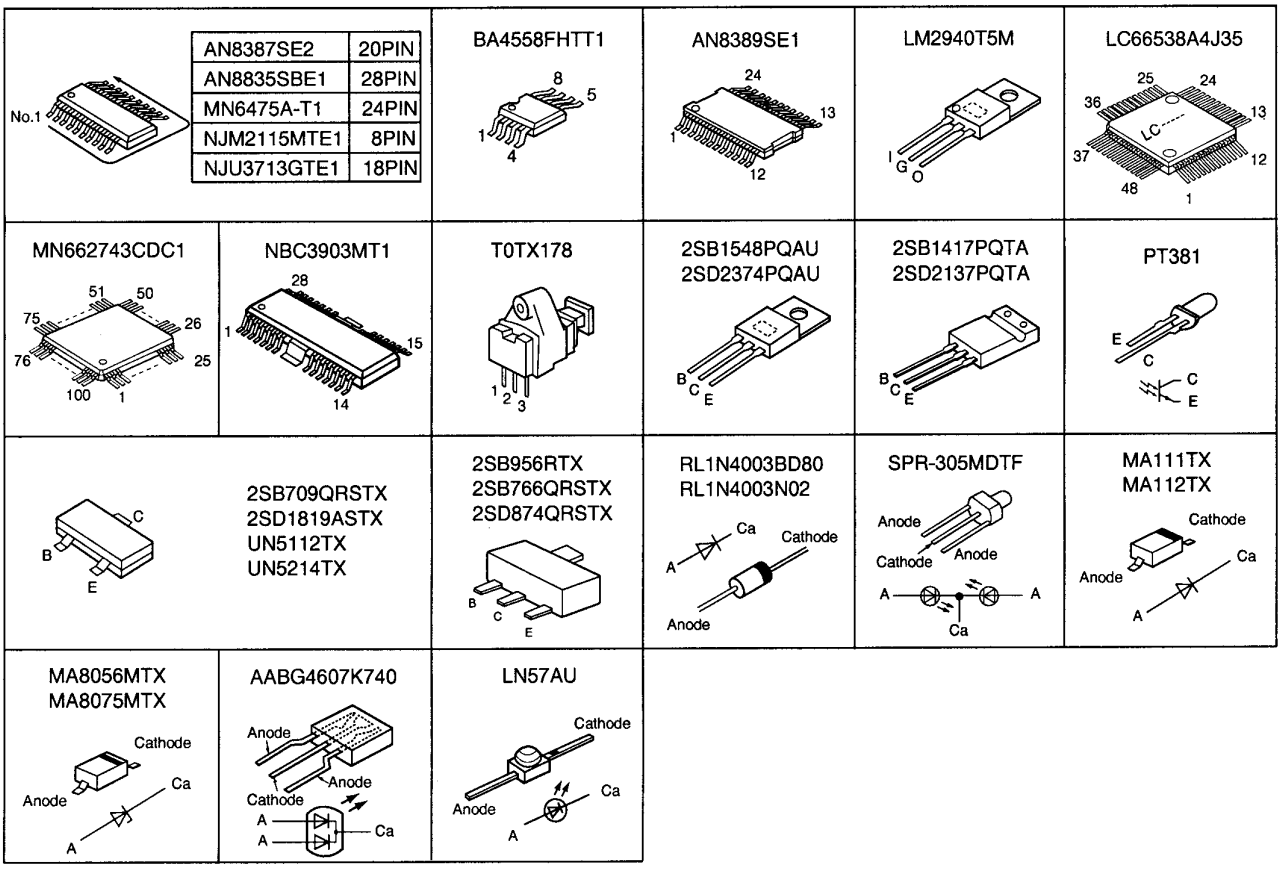
- **Caution** !
  IC and LSI are sensitive to static electricity.
  Secondary trouble can be prevented by taking care during repair.
  Cover the parts boxes made of plastics with aluminum foil.
  Ground the soldering iron.
  Put a conductive mat on the work table.
  Do not touch the legs of IC or LSI with the fingers directly.

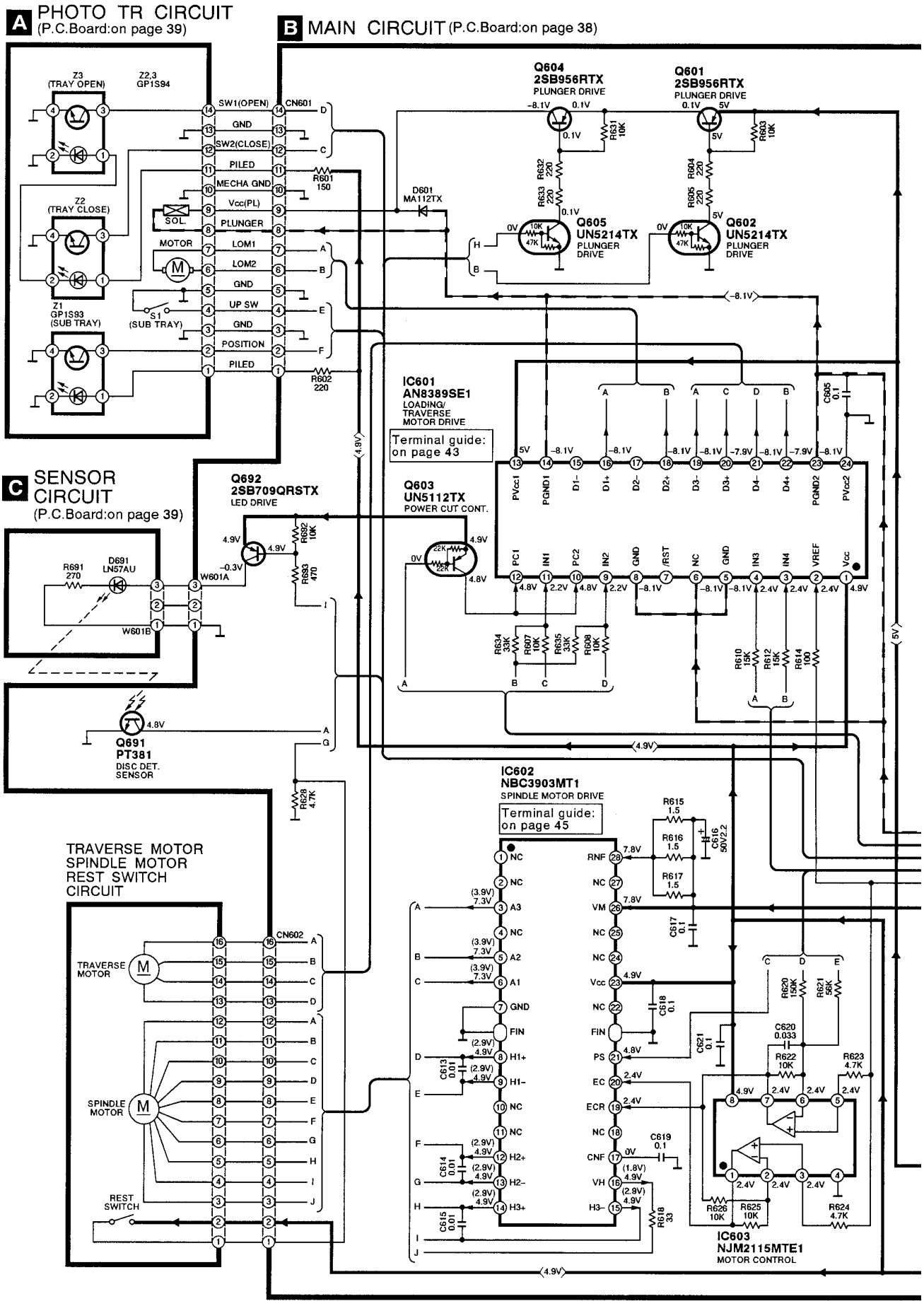
- Voltage and signal line

: Positive voltage line : Negative voltage line

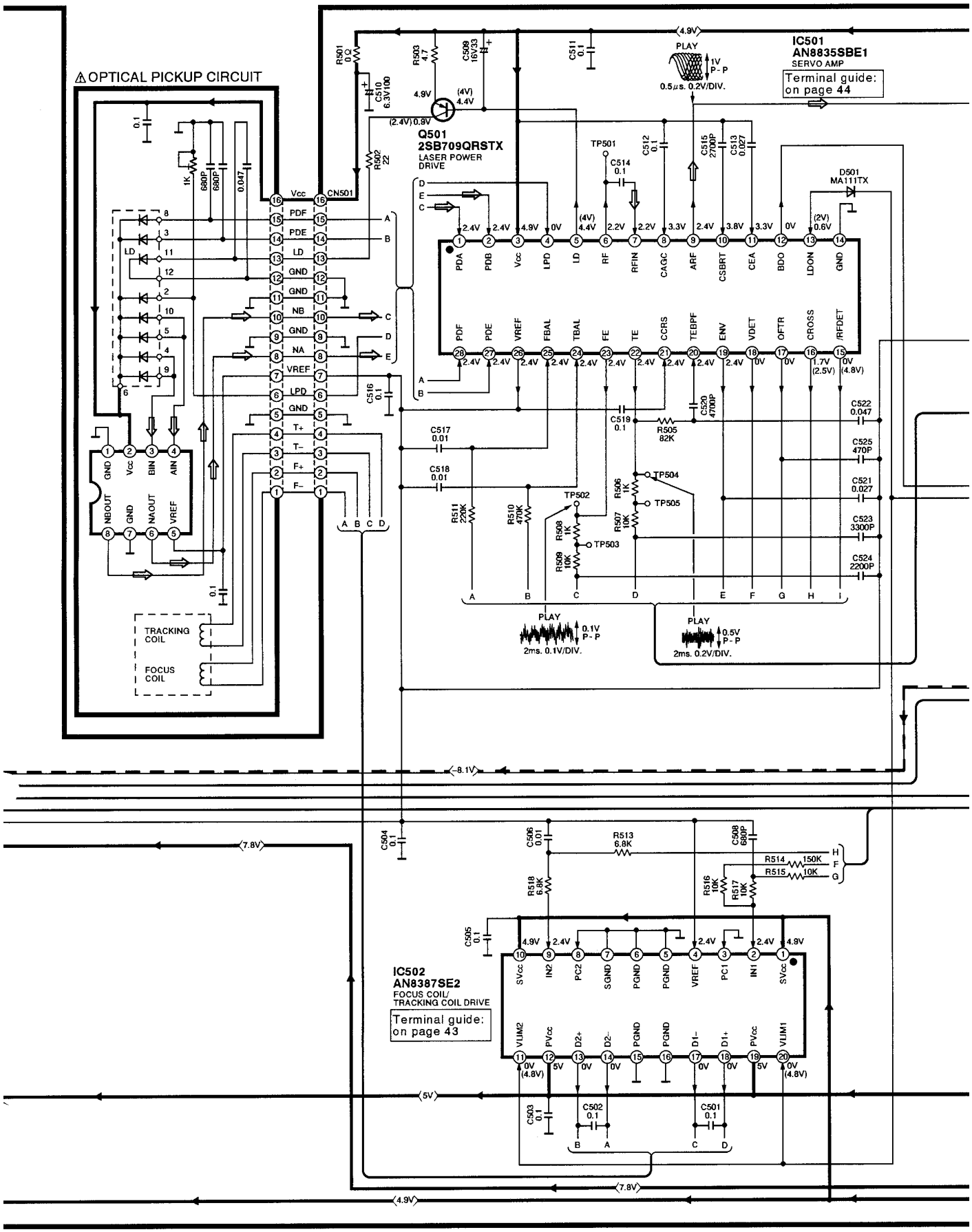
: CD signal

●Terminal guide of IC's, transistors and diodes

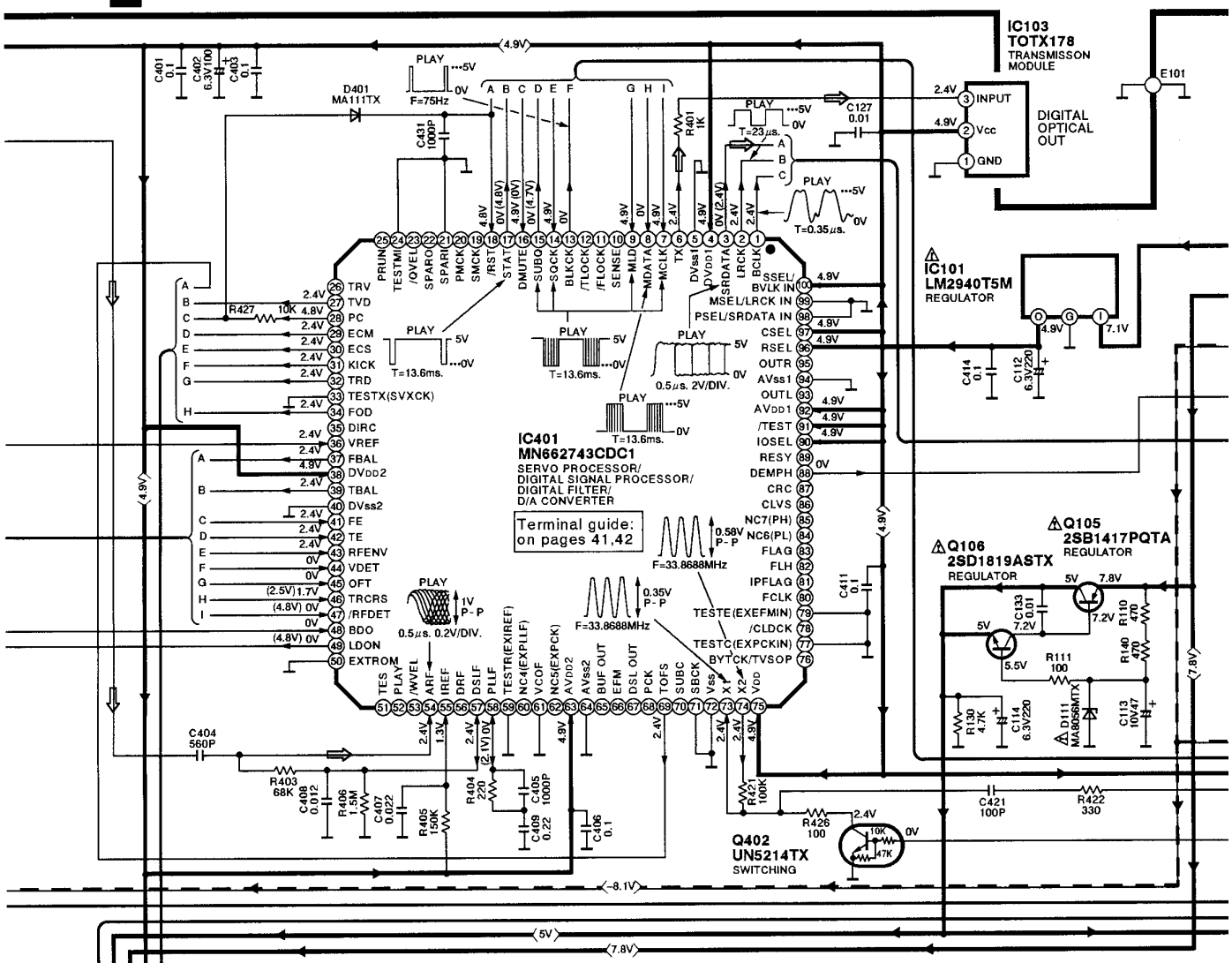



A PHOTO TR CIRCUIT
(P.C.Board:on page 39)
B MAIN CIRCUIT (P.C.Board:on page 38)
C SENSOR CIRCUIT
(P.C.Board:on page 39)
TRAVERSE MOTOR
SPINDLE MOTOR
REST SWITCH
CIRCUIT
Z3 (TRAY OPEN)
Z2,3 GP1S94
Z2 (TRAY CLOSE)
Z1 GP1S93 (SUB TRAY)
S1 (SUB TRAY)
SOL.
MOTOR
SW1(OPEN)
GND
SW2(CLOSE)
PILED
MECHA GND
Vcc(PL)
PLUNGER
LOM1
LOM2
GND
UP SW
GND
POSITION
PILED
CN601
R601 150
R602 220
D601 MA112TX
Q604 2SB956RTX PLUNGER DRIVE
Q601 2SB956RTX PLUNGER DRIVE
Q605 UN5214TX PLUNGER DRIVE
Q602 UN5214TX PLUNGER DRIVE
IC601 AN8389SE1 LOADING/ TRAVERSE MOTOR DRIVE
Terminal guide: on page 43
PVcc1 PGND1 D1- D1+ D2- D2+ D3- D3+ D4- D4+ PGND2 PVcc2
Q603 UN5112TX POWER CUT CONT.
PC1 IN1 PC2 IN2 GND /RST NC GND IN3 IN4 VREF Vcc
Q692 2SB709QRSTX LED DRIVE
R691 270
D691 LN57AU
W601A
W601B
Q691 PT381 DISC DET. SENSOR
R628 4.7K
IC602 NBC3903MT1 SPINDLE MOTOR DRIVE
Terminal guide: on page 45
IC603 NJM2115MTE1 MOTOR CONTROL
CN602
TRAVERSE MOTOR
SPINDLE MOTOR
REST SWITCH
-8.1V
4.9V
5V

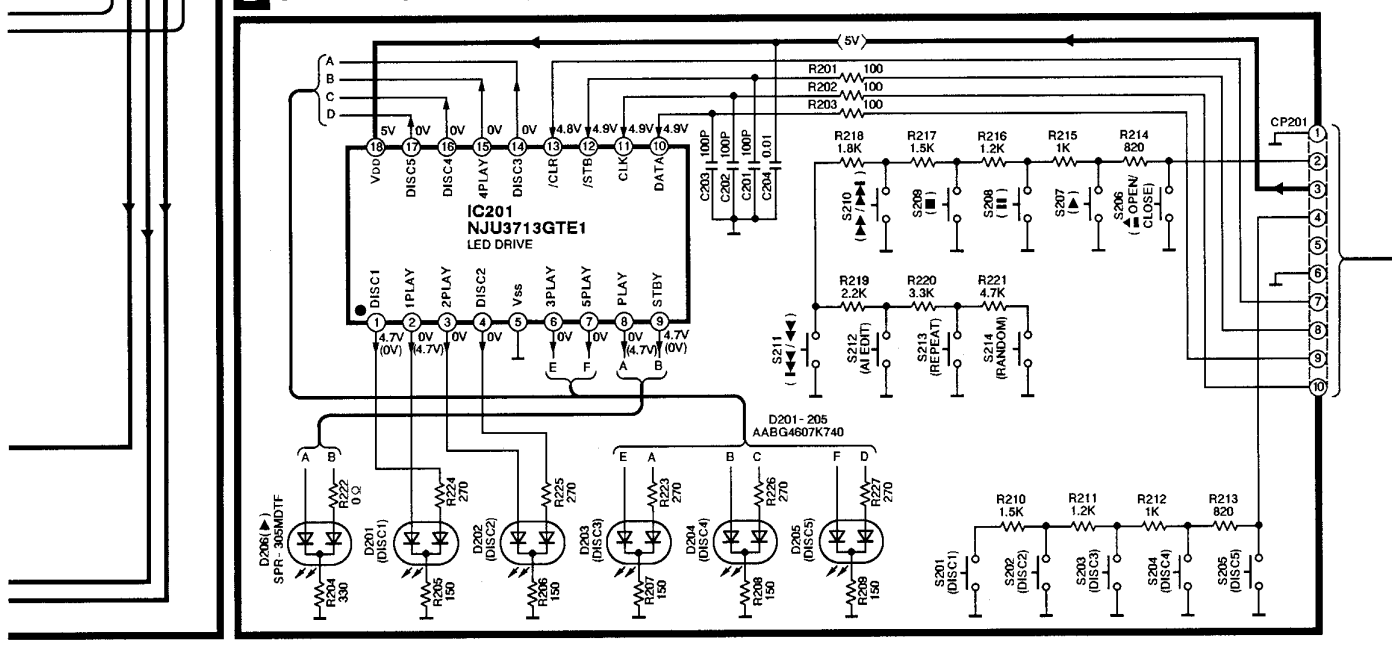
● Signal line ⇨ : CD signal



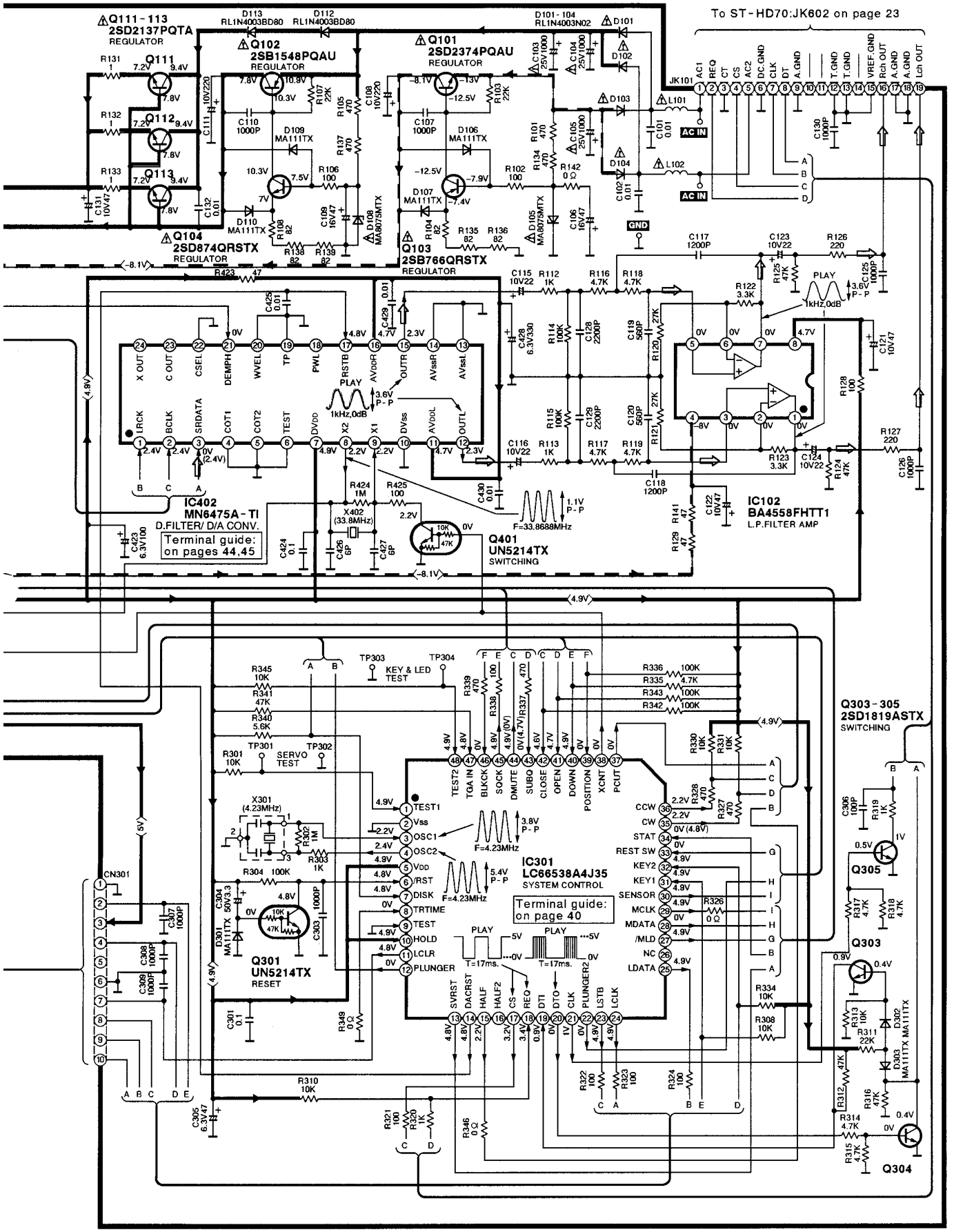
B MAIN CIRCUIT (P.C.Board:on page 38)



D OPERATION CIRCUIT (P.C.Board:on page 39)

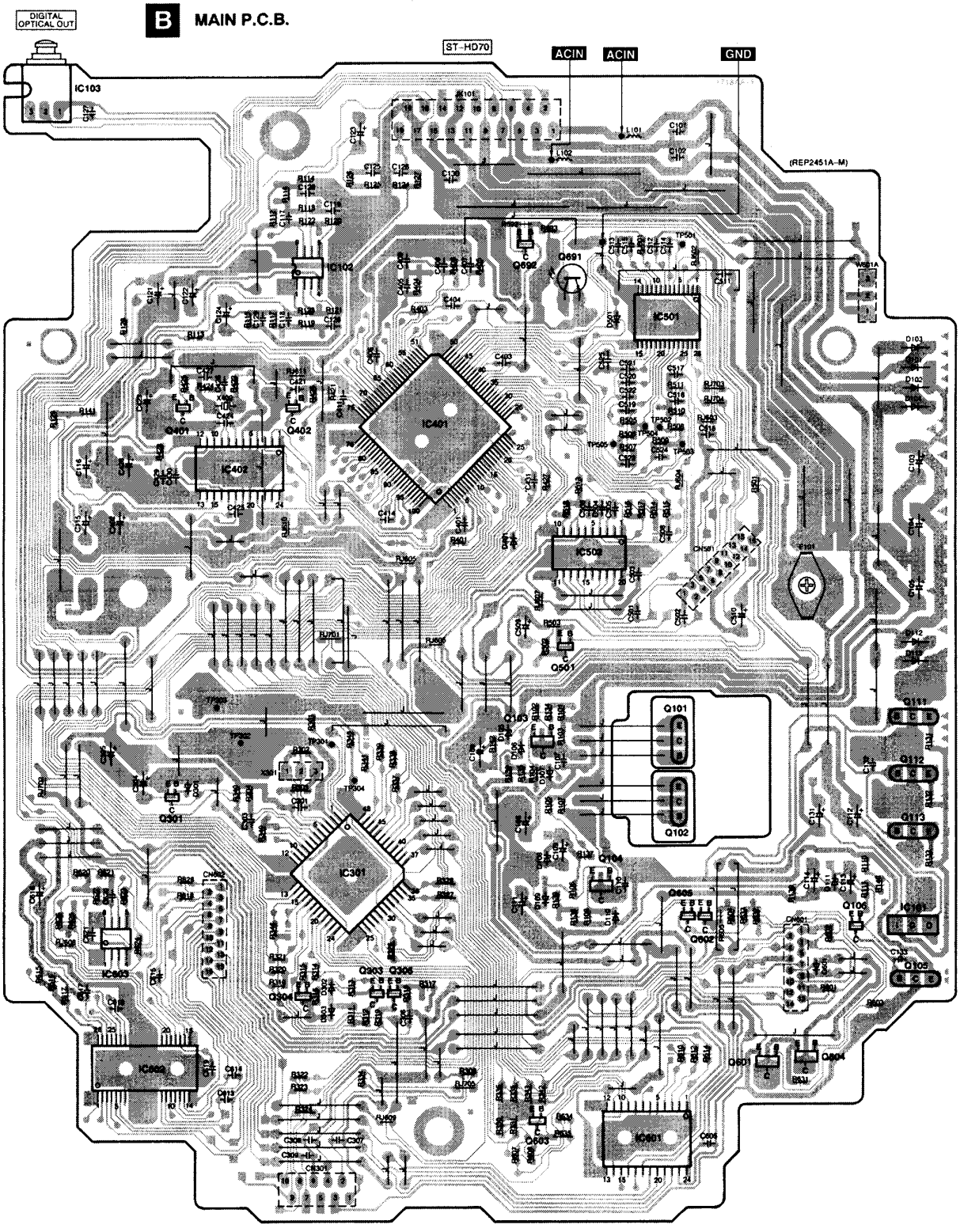


● Signal line ⇨ : CD signal

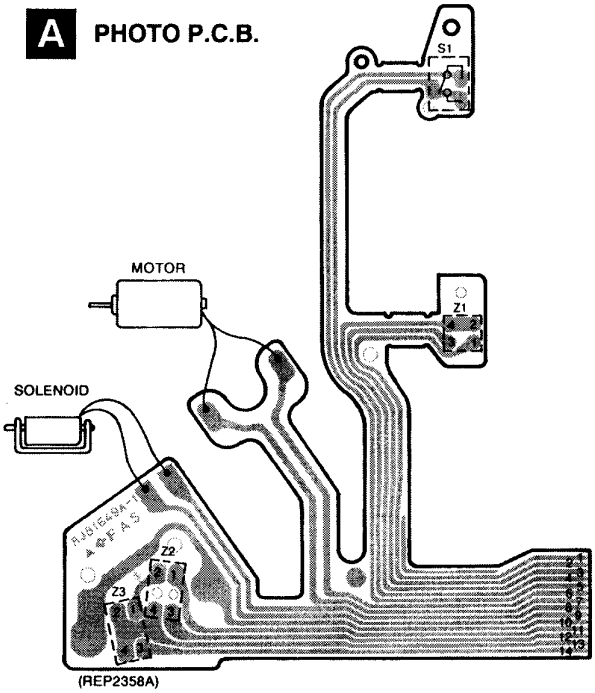


■ Printed Circiut Board Diagram

- This printed circuit board diagram may be modified at any time with the development of new technology.

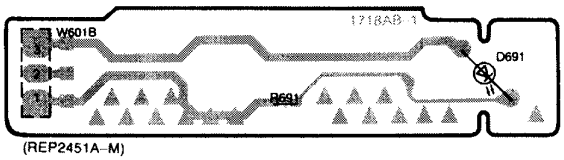


A PHOTO P.C.B.



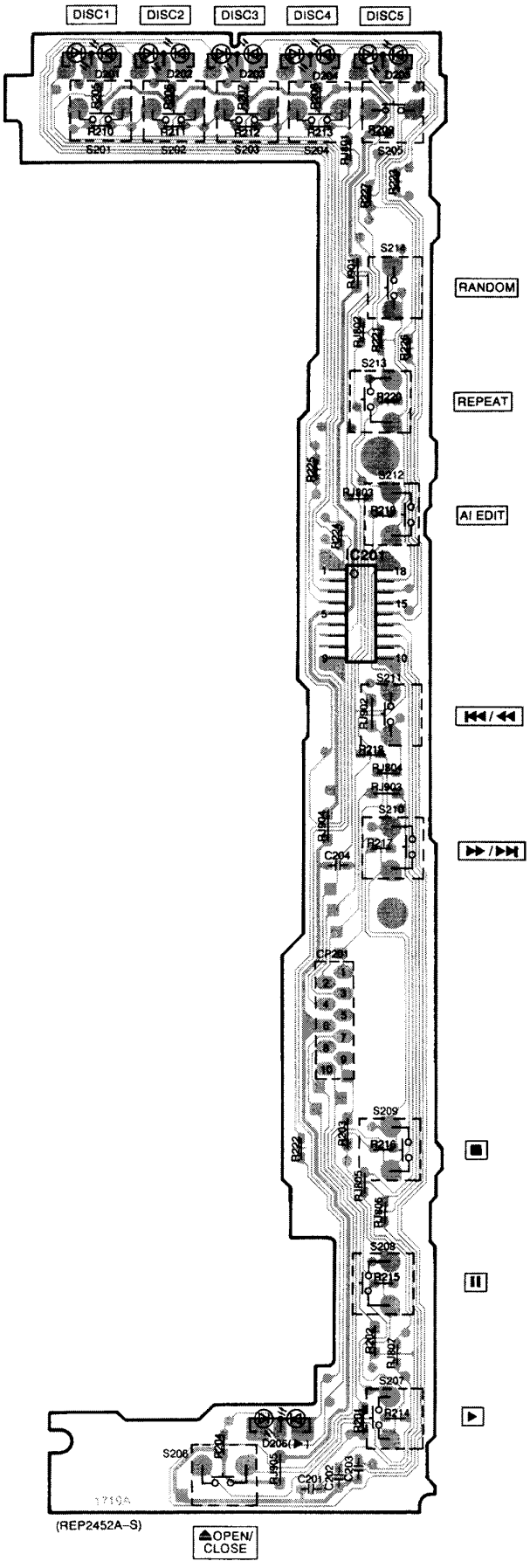
(REP2358A)

C SENSOR P.C.B.



(REP2451A-M)

D OPERATION P.C.B.



(REP2452A-S)

■ Terminal Guide

• IC301 (LC66538A4J35): SYSTEM CONTROL

Pin No.	Mark	I/O Division	Function
1	TEST1	I	Test terminal
2	Vss	—	GND terminal
3	OSC1	I	Crystal OSC terminal (f=4.2336MHz)
4	OSC2	O	
5	VDD	I	Power supply input terminal
6	/RST	I	Reset signal input terminal
7	DISK	O	Disc detect input terminal
8	TRTIME	I	Time constant input terminal
9	TEST	I	Test terminal
10	HOLD	I	Not used, connected to VDD
11	LCLR	O	Clear output terminal
12	PLUNGER	O	Plunger(solenoid) control output terminal
13	SVRST	O	Reset signal output terminal
14	DACRST	O	Reset signal output terminal
15	HALF	O	Loading motor control output terminal
16	HALF2	O	Loading motor control output terminal (Not used, open)
17	CS	O	Communication chip select signal output terminal
18	REQ	I	Communication request signal input terminal
19	DTI	I	Communication data signal input/ output terminal
20	DTO	O	
21	CLK	O	Communication clock signal output terminal
22	PLUNGER2	O	Plunger(solenoid) control output terminal
23	LSTB	O	Storobe signal output terminal
24	LCLK	O	Command clock output terminal

Pin No.	Mark	I/O Division	Function
25	LDATA	O	Command data output terminal
26	NC	—	Not used, open
27	/MLD	O	Command load signal output terminal
28	MDATA	O	Command data signal output terminal
29	MCLK	O	Command clock signal output terminal
30	SENSOR	O	LED sensor drive output terminal
31	KEY1	I	Key switch detect input terminal
32	KEY2	I	
33	REST SW	I	Rest position det. input terminal
34	STAT	I	Status signal input terminal
35	CW	O	Loading motor drive output terminal
36	CCW	O	
37	PCUT	O	Power control output terminal
38	XCNT	O	Crystal OSC control output terminal
39	POSITION	I	Sub tray position detect input terminal
40	DOWN	I	Sub tray "DOWN" det. input terminal
41	OPEN	I	Disc tray "OPEN" det. input terminal
42	CLOSE	I	Disc tray "CLOSE" det. input terminal
43	SUBQ	I	Sub-code Q data input terminal
44	DMUTE	O	Muting signal output terminal
45	SQCK	O	Sub-code Q register clock output terminal
46	BLKCK	I	Sub-code block clock input terminal (f = 75Hz)
47	TGAIN	I	Not used, connected to external resistor
48	TEST2	I	Test terminal

• IC401 (MN662743CDC1): SERVO PROCESSOR / DIGITAL SIGNAL PROCESSOR / DIGITAL FILTER / D/A CONVERTER

Pin No.	Mark	I/O Division	Function
1	BLK	O	Bit clock output for serial data
2	LRCK	O	L/R identification signal output ("H": L-ch audio data, "L": R-ch audio data)
3	SRDATA	O	Serial data output
4	DVDD1	I	Power supply input (for digital circuit)
5	DVSS1	—	GND terminal (for digital circuit)
6	TX	O	Digital audio interface signal output
7	MCLK	I	Microprocessor command clock signal input (Latches data at first transition)
8	MDATA	I	Microprocessor command data signal input
9	MLD	I	Microprocessor command load signal input ("L": load)
10	SENSE	O	Sense signal output (OFT, FESL, NACEND, NAJEND, POSAD, SFG, NWTEND) (Not used, open)
11	/FLOCK	O	Focus servo feeding signal output ("L" : Feed) (Not used, open)
12	/TLOCK	O	Tracking servo feeding signal output ("L" : Feed) (Not used, open)
13	BLKCK	O	Sub-code block clock signal output (f=75 Hz)
14	SQCK	I	External clock signal input for sub-code Q resister
15	SUBQ	O	Sub-code Q code output
16	DMUTE	I	Muting signal input ("H" : MUTE)
17	STAT	O	Status signal output (CRC, CUE, CLVS, TTSTVP, FCLV, SQCK, FLAG6, SENSE, /FLOCK, /TLOCK)
18	/RST	I	Reset signal input ("L" : reset) at IOSEL="L": (472ns and over="L")
19	SMCK	O	Clock signal output at MSEL="H" (8.4672 MHz) at MSEL="L" (16.9344 MHz) (Not used, open)
20	PMCK	O	Clock signal output (88.2kHz) (Not used open)
21	SPARI	I	Test terminal (normally "L")
22	SPARO	O	Test terminal (normally "open")
23	/QVEL	O	Quadruple speed status signal output ("L" : quadruple speed)(Not used, open)
24	TESTMI	I	Test terminal (pull-down terminal) (normally "L")
25	PRUN	O	Optical pickup tracking detection signal output (Not used, open)
26	TRV	O	Traverse forced feed signal output (Not used, open)
27	TVD	O	Traverse drive signal output
28	PC	O	Spindle motor ON signal output ("L": ON, default)
29	ECM	O	Spindle motor drive signal output (forced mode output)
30	ECS	O	Spindle motor drive signal output (Servo error signal output)
31	KICK	O	Kick pulse output
32	TRD	O	Tracking drive signal output
33	TESTX	I	Test terminal (normally "L")
34	FOD	O	Focus drive signal output
35	DIRC	O	Optical pickup tracking direction detection signal (Not used, open)
36	VREF	I	Reference voltage input of D/A(drive) output (TVD,ECS,TRD,FOD,FBAL,TBAL,TOFS)
37	FBAL	O	Focus balance adjustment signal output
38	DVDD2	I	Power supply input (for digital circuit)
39	TBAL	O	Tracking balance adjustment signal output
40	DVss2	—	GND terminal (for digital circuit)
41	FE	I	Focus error signal input (analog input)
42	TE	I	Tracking error signal input (analog input)
43	RFENV	I	RF envelope signal input (analog input)
44	VDET	I	Vibration detection signal input ("H": detectoion)
45	OFT	I	Off-track signal input ("H": off track)
46	TRCRS	I	Track cross signal input
47	/RFDET	I	RF detection signal input ("L": detection)
48	BDO	I	Dropout signal input ("H": Dropout)
49	LDON	O	Laser on signal output ("H": ON)
50	EXTROM	I	Test terminal (normally "L")
51	TES	O	Tracking error shunt signal output ("H": shunt) (Not used, open)
52	PLAY	O	Play signal out ("H": PLAY) (Not used, open)
53	/WVEL	O	Double speed status signal output ("L": Double speed) (Not used, open)
54	ARF	I	RF signal input
55	IREF	I	Reference current input terminal

Pin No.	Mark	I/O Division	Function
56	DRF	I	DSL bias terminal (Not used, open)
57	DSLF	I/O	DSL loop filter terminal
58	PLLF	I/O	PLL loop filter terminal
59	TESTR	I	Test terminal (EXIREF)(normally "L")
60	EXPLLF	O	Test terminal (normally "open")
61	VCOF	I/O	VCO loop filter terminal (Not used, connected to GND)
62	EXPCK	O	Test terminal (normally "open")
63	AVDD2	I	Power supply input for analog circuit (DSL,PLL,DA OUTPUT,AD
64	AVss2	—	GND terminal for analog circuit (DSL,PLL,DA OUTPUT,AD
65	BUFOUT	O	Test terminal (normally "open")
66	EFM	O	at IOSEL="H"; EFM signal output at IOSEL="L"; Clock signal output (16.9344 MHz) (Not used, open)
67	DSLOUT	O	Test terminal (normally "open")
68	PCK	O	PLL extraction clock signal output (fPCK=4.321 MHz) (Not used, open)
69	TOFS	O	Tracking offset adjustments signal output
70	SUBC	O	Sub-code serial data output (Not used, open)
71	SBCK	I	Clock signal input for sub-code serial data (Not used, connected to GND)
72	Vss	—	GND terminal (for oscillating circuit)
73	X1	I	Crystal oscillating circuit output (f=33.8688 MHz)
74	X2	O	Crystal oscillating circuit output (f=33.8688 MHz)
75	VDD	I	Power supply input (for oscillating circuit)
76	BYTCK	O	at IOSEL="H" Byte clock signal output at IOSEL="L" Traverse stop signal output ("H": stop mode) (Not used, open)
77	TESTC	I	Test terminal (EXPCKIN) (normally"L")
78	/CLDCK	O	Sub-code frame clock signal output (fCLDCK=7.35kHz) (Not used, open)
79	TESTE	I	Test terminal (EXEFMIN) (normally"L")
80	FCLK	O	Crystal frame clock signal output (fFCLK=7.35kHz) (Not used, open)

Pin No.	Mark	I/O Division	Function
81	IPFLAG	O	Interpolation flag signal output ("H": Interpolation) (Not used, open)
82	FLH	O	Speed detection result output (3-state output) (Not used, open)
83	FLAG	O	Flag signal output (Not used, open)
84	NC6(PL)	O	Test terminal (normally "open")
85	NC&(PH)	O	Test terminal (normally "open")
86	CLVS	O	Spindle servo phase synchronizing signal output (Not used, open) ("H": CLV, "L": rough servo)
87	CRC	O	Sub-code CRC checked result output ("H": OK, "L": NG) (Not used, open)
88	DEMPH	O	De-emphasis detection signal output ("H": ON)
89	RESY	O	at IOSEL="H"; Frame sync. resynchronization signal output "H": pull in "L": pull out at IOSEL="L"; Error correction deinterleaving RAM address reset signal FLAG6 output "L": address reset generation (Not used, open)
90	IOSEL	I	Mode switching terminal
91	/TEST	I	Test terminal (normally "L")
92	AVDD1	I	Power supply terminal for analog circuit [for audio output(use as L-ch and R-ch)]
93	OUTL	O	Left channel audio signal output
94	AVss1	—	GND terminal for analog circuit [for audio output(use as L-ch and R-ch)]
95	OUTR	O	Right chennel audio signal output
96	RSEL	I	RF signal polarity assignment terminal (at "H" level: RSEL= "H") (at "L" level: RSEL= "L")
97	CSEL	I	Crystal oscillating frequency designation input ("H": 33.8688MHz)
98	PSEL/ SRDATAIN	I	at IOSEL="H" Test terminal (normally "L") at IOSEL="L" SRDATA input terminal
99	MSEL/ LRCKIN	I	at IOSEL="H" Output freqency switching of SMCK terminal "H": SMCK=8.4672MHz "L": SMCK=16.9344MHz at IOSEL="L" LRCK input terminal "H": L-ch data, "L": R-ch data (SMCK terminal output=16.9344MHz)
100	SSEL/ BCLKIN	I	at IOSEL="H" Output mode switching of SUBQ terminal "H": Q code buffer mode at IOSEL="L" BCLK input terminal "H": L-ch data, "L": R-ch data (SUB Q terminal output mode=Q code buffer mode)

• IC601 (AN8389SE1): LOADING MOTOR / TRAVERSE MOTOR DRIVE

Pin No.	Mark	I/O Division	Function
1	Vcc	I	Power supply terminal
2	VREF	I	Reference voltage input terminal
3	IN4	I	Traverse motor driver (4) input
4	IN3	I	Traverse motor driver (3) input
5	GND	I	GND terminal (Connected to negative voltage)
6	NC	I	Not used, connected to negative voltage
7	/RST	O	Reset terminal (Not used, open)
8	GND	I	GND terminal (Connected to negative voltage)
9	IN2	O	Loading motor driver (2) input
10	PC2	I	Loading motor drive signal (" L " : ON)
11	IN1	I	Loading motor driver (1) input
12	PC1	I	Loading motor drive signal (" L " : ON)

Pin No.	Mark	I/O Division	Function
13	PVcc1	I	Driver power supply terminal (1)
14	PGND1	I	Driver GND terminal (1) (Connected to negative voltage)
15	D1-	O	Motor driver (1) output terminal (-) (Not used, open)
16	D1+	O	Loading motor driver (1) output terminal (+)
17	D2-	O	Motor driver (2) output terminal (-) (Not used, open)
18	D2+	O	Motor driver (2) output terminal (+)
19	D3-	O	Traverse motor driver (3) output terminal (-)
20	D3+	O	Traverse motor driver (3) output terminal (+)
21	D4-	O	Traverse motor driver (4) output terminal (-)
22	D4+	O	Traverse motor driver (4) output terminal (+)
23	PGND2	I	Driver GND terminal (2) (Connected to negative voltage)
24	PVcc2	I	Driver power supply (2)

• IC502 (AN8387SE2): FOCUS COIL/TRACKING COIL DRIVE

Pin No.	Mark	I/O Division	Function
1	SVcc	I	Power supply terminal
2	IN1	I	Tracking coil drive input terminal
3	PC1	I	Power control input terminal (Not used, connected to GND)
4	VREF	I	Reference voltage input terminal
5	PGND	—	GND terminal
6	PGND	—	GND terminal
7	SGND	—	GND terminal
8	PC2	I	Power control input terminal (Not used, connected to GND)
9	IN2	I	Focus coil drive input terminal
10	SVcc	I	Power supply terminal

Pin No.	Mark	I/O Division	Function
11	VLIM2	I	Voltage limit terminal
12	PVcc	I	Power supply terminal
13	D2+	O	Focus coil drive output terminal (+)
14	D2-	O	Focus coil drive output terminal (-)
15	PGND	—	GND terminal
16	PGND	—	GND terminal
17	D1-	O	Tracking coil drive output terminal (-)
18	D1+	O	Tracking coil drive output terminal (+)
19	PVcc	I	Power supply terminal
20	VLIM1	I	Voltage limit terminal

• IC501 (AN8835SBE1): SERVO AMP

Pin No.	Mark	I/O Division	Function
1	PDA	I	Focus signal input terminal (1) (Ach)
2	PDB	I	Focus signal input terminal (2) (Bch)
3	V_{CC}	I	Power supply terminal
4	LPD	I	APC amp input terminal
5	LD	O	APC amp output terminal
6	RF	O	RF summing output terminal
7	RF IN	I	AGC input terminal
8	CAGC	I	AGC detection capacitor input
9	ARF	O	RF signal output terminal
10	CSBRT	I	Capacitor connection terminal for OFTR
11	CEA	I	Capacitor connection terminal for H.P.F. amp
12	BDO	O	Dropout signal output terminal ("H" : Dropout)
13	LDON	I	APC control input terminal (" H " : ON, " L " : OFF)
14	GND	—	GND terminal

Pin No.	Mark	I/O Division	Function
15	/RFDET	O	RF det. signal output terminal ("L" : Det.)
16	CROSS	O	Track cross signal output terminal
17	OFTR	O	Off track signal output terminal ("H" : Off track)
18	VDET	O	Vibration det. signal output terminal ("H" : Det.)
19	ENV	O	RF envelope signal output termina
20	TEBPF	I	Oscillation detect input terminal (Not used, open)
21	CCRS	I	CROSS capacitor connection terminal
22	TE	O	Tracking error amp output terminal
23	FE	O	Focus error amp output terminal
24	TBAL	I	Tracking balance adj. input terminal
25	FBAL	I	Focus balance adj. input terminal
26	VREF	O	Reference voltage output terminal
27	PDE	I	Tracking signal input terminal (1) (E ch)
28	PDF	I	Tracking signal input terminal (2) (F ch)

• IC402 (MN6475A-T1): DIGITAL FILTER AND D/A CONVERTER

Pin No.	Mark	I/O Division	Function
1	LRCK	I	L/R channel discrimination input terminal
2	BCLK	I	Bit clock input terminal
3	SRDATA	I	Serial data input terminal
4	COT1	I	Signal selection output terminal (COT1: L / COT2: L ; Normal, stereo signal output)
5	COT2	I	
6	TEST	I	Test terminal (Normal "L")

Pin No.	Mark	I/O Division	Function
7	DV_{DD}	I	Power supply terminal
8	X2	O	Crystal OSC terminal (f = 33.8688MHz)
9	X1	I	
10	DV_{SS}	—	GND terminal
11	AV_{DDL}	I	Power supply (L channel) terminal
12	OUTL	O	L channel analog signal output terminal

Pin No.	Mark	I/O Division	Function
13	AVssL	—	GND (L channel) terminal
14	AVssR	—	GND (L channel) terminal
15	OUTR	O	R channel analog signal output terminal
16	AVDDR	I	Power supply (R channel) terminal
17	RSTB	I	Reset signal input terminal
18	PWL	—	Not used, open

Pin No.	Mark	I/O Division	Function
19	TP	—	Not used, connected to GND
20	WVEL	—	Not used, connected to GND
21	DEMPH	I	De-emphasis on/off control terminal (De-emphasis on: H)
22	CSEL	I	Frequency select(COUT) input terminal (1/4f:" L", 1/2f: "H")
23	COUT	O	Frequency(192fs) clock output terminal (Not used, open)
24	XOUT	O	Frequency(384fs) clock output terminal (Not used, open)

• IC602 (NBC3903MT1): SPINDLE MOTOR DRIVE

Pin No.	Mark	I/O Division	Function
1	NC	—	Not used, open
2	NC	—	Not used, open
3	A3	O	Spindle motor drive output terminal
4	NC	—	Not used, open
5	A2	O	Spindle motor drive output terminal
6	A1	O	Spindle motor drive output terminal
7	GND	—	GND terminal
8	H1+	I	Hall element detect (+) input terminal
9	H1-	I	Hall element detect (-) input terminal
10	NC	—	Not used, open
11	NC	—	Not used, open
12	H2+	I	Hall element detect (+) input terminal
13	H2-	I	Hall element detect (-) input terminal
14	H3+	I	Hall element detect (+) input terminal

Pin No.	Mark	I/O Division	Function
15	H3-	I	Hall element detect (-) input terminal
16	VH	O	Hall element bias output terminal
17	CNF	I	Time constant control terminal
18	NC	—	Not used, open
19	ECR	I	Torque sense amp (-) input terminal
20	EC	I	Torque sense amp (+) input terminal
21	PS	I	Power control input terminal
22	NC	—	Not used, open
23	Vcc	I	Power supply terminal
24	NC	—	Not used, open
25	NC	—	Not used, open
26	VM	I	Power supply terminal
27	NC	—	Not used, open
28	RNF	I	Current sense amp (-) and coil driver input terminal

■ Replacement Parts List (Electrical)

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
* Warning: This product uses a laser diode. Refer to caution statements on page 2.
* ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereinheit darf nur gegen einc vom hersteller spezifizierte einheit ausgetauscht werden.
* [M] indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC101	LM2940T5	IC	[M]⚠
IC102	BA4558FHTT1	IC	[M]
IC103	TOTX178	IC	[M]
IC201	NJU3713GTE1	IC	[M]
IC301	LC66538A4J35	IC	[M]
IC401	MN662743CDC1	IC	[M]
IC402	MN6475A-T1	IC	[M]
IC501	AN8835SBE1	IC	[M]
IC502	AN8387SE2	IC	[M]
IC601	AN8389SE1	IC	[M]
IC602	NBC3903MT1	IC	[M]
IC603	NJM2115MT1	IC	[M]
		TRANSISTOR(S)	
Q101	2SD2374PQAU	TRANSISTOR	[M]⚠
Q102	2SB1548PQAU	TRANSISTOR	[M]⚠
Q103	2SB766-QRSTX	TRANSISTOR	[M]⚠
Q104	2SD874QRSTX	TRANSISTOR	[M]⚠
Q105	2SB1417PQTA	TRANSISTOR	[M]⚠
Q106	2SD1819ASTX	TRANSISTOR	[M]⚠
Q111-113	2SD2137PQTA	TRANSISTOR	[M]⚠
Q301	UN5214TX	TRANSISTOR	[M]
Q303-305	2SD1819ASTX	TRANSISTOR	[M]
Q401, 402	UN5214TX	TRANSISTOR	[M]
Q501	2SB709QRSTX	TRANSISTOR	[M]
Q601	2SB956RTX	TRANSISTOR	[M]
Q602	UN5214TX	TRANSISTOR	[M]
Q603	UN5112TX	TRANSISTOR	[M]
Q604	2SB956RTX	TRANSISTOR	[M]
Q605	UN5214TX	TRANSISTOR	[M]
Q691	PT381TB	TRANSISTOR	[M]
Q692	2SB709QRSTX	TRANSISTOR	[M]
		DIODE(S)	
D101-104	RL1N4003N02	DIODE	[M]⚠
D105	MA8075	DIODE	[M]⚠
D106, 107	MA111TX	DIODE	[M]
D108	MA8075	DIODE	[M]⚠
D109, 110	MA111TX	DIODE	[M]
D111	MA8056MTX	DIODE	[M]⚠

Ref. No.	Part No.	Part Name & Description	Remarks
D112, 113	RL1N4003BD80	DIODE	[M]
D201-205	AABG4607K740	L. E. D.	[M]
D206	SPR-305MDTF	L. E. D.	[M]
D301-303	MA111TX	DIODE	[M]
D401	MA111TX	DIODE	[M]
D501	MA111TX	DIODE	[M]
D601	MA112TX	DIODE	[M]
D691	LN57AU	L. E. D.	[M]
		PHOTO INTERRUPTER(S)	
Z1	GP1S93	PHOTO INTERRUPTER	[M]
Z2, 3	GP1S94	PHOTO INTERRUPTER	[M]
		COIL(S)	
L101, 102	RLBN300AV-W	COIL	[M]⚠
		OSCILLATOR(S)	
X301	EFOEC4234T3	OSCILLATOR	[M]
X402	RSXC33M8R01	OSCILLATOR	[M]
		SWITCH(ES)	
S1	RSH2B003-U	SW	[M]
S201-205	EVQPJH05K	SW	[M]
S206-214	EVQ21405R	SW	[M]
		CONNECTOR(S) AND SOCKET(S)	
CN301	RJU099W10	SOCKET(10P)	[M]
CN501	RJS2A4716M	CONNECTOR(16P)	[M]
CN601	RJS2A4714M	CONNECTOR(14P)	[M]
CN602	RJS2A4716M	CONNECTOR(16P)	[M]
CP201	RJT099W10-1	CONNECTOR(10P)	[M]
JK101	RJT065K19	CONNECTOR(19P)	[M]
		EARTH PLATE(S)	
E101	SNE1004-2	EARTH PLATE	[M]
		FLAT CABLE(S)	
W601	REZ0961	FLAT CABLE(3P)	[M]

Resistors and Capacitors

Notes:
* Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads (pF) F=Farads (F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000 (OHM), 1M=1,000k (OHM)
* [M] indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R101	ERJ6GEYJ471V	1/10W 470 [M]
R102	ERJ6GEYJ101V	1/10W 100 [M]
R103	ERJ6GEYJ223V	1/10W 22K [M]
R104	ERJ6GEYJ820V	1/10W 82 [M]
R105	ERJ6GEYJ471V	1/10W 470 [M]
R106	ERJ6GEYJ101V	1/10W 100 [M]
R107	ERJ6GEYJ223V	1/10W 22K [M]
R108	ERJ6GEYJ820V	1/10W 82 [M]
R110	ERJ6GEYJ471V	1/10W 470 [M]
R111	ERJ6GEYJ101V	1/10W 100 [M]
R112, 113	ERJ6GEYJ102V	1/10W 1K [M]
R114, 115	ERJ6GEYJ104V	1/10W 100K [M]
R116-119	ERJ6GEYJ472V	1/10W 4.7K [M]
R120, 121	ERJ6GEYJ273V	1/10W 27K [M]
R122, 123	ERJ6GEYJ332V	1/10W 3.3K [M]
R124, 125	ERJ6GEYJ473V	1/10W 47K [M]
R126, 127	ERJ6GEYJ221V	1/10W 220 [M]
R128	ERJ6GEYJ101V	1/10W 100 [M]
R129	ERJ6GEYJ470V	1/10W 47 [M]
R130	ERJ6GEYJ472V	1/10W 4.7K [M]
R131-133	ERJ6GEYJ1R0V	1/10W 1.0 [M]
R134	ERJ6GEYJ471V	1/10W 470 [M]
R135, 136	ERJ6GEYJ820V	1/10W 82 [M]
R137	ERJ6GEYJ471V	1/10W 470 [M]
R138, 139	ERJ6GEYJ820V	1/10W 82 [M]
R140	ERJ6GEYJ471V	1/10W 470 [M]
R141	ERJ6GEYJ470V	1/10W 47 [M]
R201-203	ERJ8GEYJ101V	1/8W 100 [M]
R204	ERJ6GEYJ331V	1/10W 330 [M]
R205-209	ERJ6GEYJ151V	1/10W 150 [M]
R210	ERJ6GEYJ152V	1/10W 1.5K [M]
R211	ERJ6GEYJ122V	1/10W 1.2K [M]
R212	ERJ6GEYJ102V	1/10W 1K [M]
R213, 214	ERJ6GEYJ821V	1/10W 820 [M]
R215	ERJ6GEYJ102V	1/10W 1K [M]
R216	ERJ6GEYJ122V	1/10W 1.2K [M]
R217	ERJ6GEYJ152V	1/10W 1.5K [M]
R218	ERJ6GEYJ182V	1/10W 1.8K [M]
R219	ERJ6GEYJ222V	1/10W 2.2K [M]
R220	ERJ6GEYJ332V	1/10W 3.3K [M]
R221	ERJ6GEYJ472V	1/10W 4.7K [M]
R223-227	ERJ6GEYJ271V	1/10W 270 [M]
R301	ERJ6GEYJ103V	1/10W 10K [M]
R302	ERJ8GEYJ105V	1/8W 1M [T]
R303	ERJ8GEYJ102V	1/8W 1K [M]
R304	ERJ6GEYJ104V	1/10W 100K [M]
R308	ERJ6GEYJ103V	1/10W 10K [M]
R310	ERJ6GEYJ103V	1/10W 10K [M]
R311	ERJ8GEYJ223V	1/8W 22K [M]
R312	ERJ6GEYJ473V	1/10W 47K [M]
R313	ERJ6GEYJ103V	1/10W 10K [M]
R314, 315	ERJ6GEYJ472V	1/10W 4.7K [M]
R316	ERJ6GEYJ473V	1/10W 47K [M]
R317, 318	ERJ6GEYJ472V	1/10W 4.7K [M]
R319, 320	ERJ6GEYJ102V	1/10W 1K [M]
R321-323	ERJ6GEYJ101V	1/10W 100 [M]
R324	ERJ8GEYJ101V	1/8W 100 [M]
R327, 328	ERJ8GEYJ471V	1/8W 470 [M]
R330, 331	ERJ8GEYJ103V	1/8W 10K [M]
R334	ERJ6GEYJ103V	1/10W 10K [M]
R335	ERJ8GEYJ472V	1/8W 4.7K [M]
R336	ERJ8GEYJ104V	1/8W 100K [M]
R337	ERJ6GEYJ471V	1/10W 470 [M]
R338	ERJ6GEYJ101V	1/10W 100 [M]
R339	ERJ6GEYJ471V	1/10W 470 [M]
R340	ERJ6GEYJ562V	1/10W 5.6K [M]
R341	ERJ6GEYJ473V	1/10W 47K [M]
R342, 343	ERJ8GEYJ104V	1/8W 100K [M]
R345	ERJ6GEYJ103V	1/10W 10K [M]
R401	ERJ6GEYJ102V	1/10W 1K [M]
R403	ERJ6GEYJ683V	1/10W 68K [M]
R404	ERJ6GEYJ221V	1/10W 220 [M]
R405	ERJ6GEYJ154V	1/10W 150K [M]
R406	ERJ6GEYJ155V	1/10W 1.5M [M]
R421	ERJ6GEYJ104V	1/10W 100K [M]
R422	ERJ6GEYJ331V	1/10W 330 [M]
R423	ERJ6GEYJ470V	1/10W 47 [M]
R424	ERJ6GEYJ105	1/10W 1M [M]
R425, 426	ERJ6GEYJ101V	1/10W 100 [M]
R427	ERJ6GEYJ103V	1/10W 10K [M]
R502	ERJ6GEYJ220	1/10W 22 [M]
R503	ERJ6GEYJ4R7V	1/10W 4.7 [M]
R505	ERJ6GEYJ823	1/10W 82K [M]
R506	ERJ6GEYJ102V	1/10W 1K [M]
R507	ERJ6GEYJ103V	1/10W 10K [M]
R508	ERJ6GEYJ102V	1/10W 1K [M]
R509	ERJ6GEYJ103V	1/10W 10K [M]
R510	ERJ6GEYJ474V	1/10W 470K [M]
R511	ERJ6GEYJ224V	1/10W 220K [M]
R513	ERJ6GEYJ682V	1/10W 6.8K [M]
R514	ERJ6GEYJ154V	1/10W 150K [M]
R515-517	ERJ6GEYJ103V	1/10W 10K [M]
R518	ERJ6GEYJ682V	1/10W 6.8K [M]
R601	ERJ6GEYJ151V	1/10W 150 [M]
R602	ERJ6GEYJ221V	1/10W 220 [M]
R603	ERJ6GEYJ103V	1/10W 10K [M]
R604, 605	ERJ6GEYJ221V	1/10W 220 [M]
R607, 608	ERJ6GEYJ103V	1/10W 10K [M]
R610	ERJ6GEYJ153V	1/10W 15K [M]
R612	ERJ6GEYJ153V	1/10W 15K [M]
R614	ERJ6GEYJ101V	1/10W 100 [M]
R615-617	ERJ6GEYJ1R5V	1/10W 1.5 [M]
R618	ERJ6GEYJ330V	1/10W 33 [M]
R620	ERJ6GEYJ154V	1/10W 150K [M]
R621	ERJ6GEYJ563V	1/10W 56K [M]
R622	ERJ6GEYJ103V	1/10W 10K [M]
R623	ERJ6GEYJ472V	1/10W 4.7K [M]
R624	ERJ8GEYJ472V	1/8W 4.7K [M]
R625, 626	ERJ6GEYJ103V	1/10W 10K [M]
R628	ERJ6GEYJ472V	1/10W 4.7K [M]
R631	ERJ6GEYJ103V	1/10W 10K [M]
R632, 633	ERJ6GEYJ221V	1/10W 220 [M]
R634	ERJ6GEYJ333V	1/10W 33K [M]
R635	ERJ8GEYJ333V	1/8W 33K [M]
R691	ERJ6GEYJ271V	1/10W 270 [M]
R692	ERJ6GEYJ103V	1/10W 10K [M]
R693	ERJ6GEYJ471V	1/10W 470 [M]
		CHIP JUMPERS
R142	ERJ6GEY0R00V	CHIP JUMPER [M]
R222	ERJ6GEY0R00V	CHIP JUMPER [M]
R326	ERJ8GEY0R00V	CHIP JUMPER [M]
R346	ERJ6GEY0R00V	CHIP JUMPER [M]
R349	ERJ6GEY0R00V	CHIP JUMPER [M]
R501	ERJ6GEY0R00V	CHIP JUMPER [M]
RJ601-611	ERJ6GEY0R00V	CHIP JUMPER [M]
RJ701-705	ERJ8GEY0R00V	CHIP JUMPER [M]
RJ801-807	ERJ6GEY0R00V	CHIP JUMPER [M]
RJ901-905	ERJ8GEY0R00V	CHIP JUMPER [M]
		CAPACITORS
C101, 102	ECUV1H103KBN	50V 0.01U [M]
C103-105	ECA1EM102B	25V 1000U [M]⚠
C106	RCE1CKS470BV	16V 47U [M]
C107	ECUV1H102KBN	50V 1000P [M]
C108	ECEA1AKS221	10V 220U [M]
C109	RCE1CKS470BV	16V 47U [M]
C110	ECUV1H102KBN	50V 1000P [M]
C111	ECEA1AKS221	10V 220U [M]
C112	ECEA0JKA221B	6.3V 220U [M]
C113	RCE1AKA470BG	10V 47U [M]
C114	ECEA0JKA221B	6.3V 220U [M]

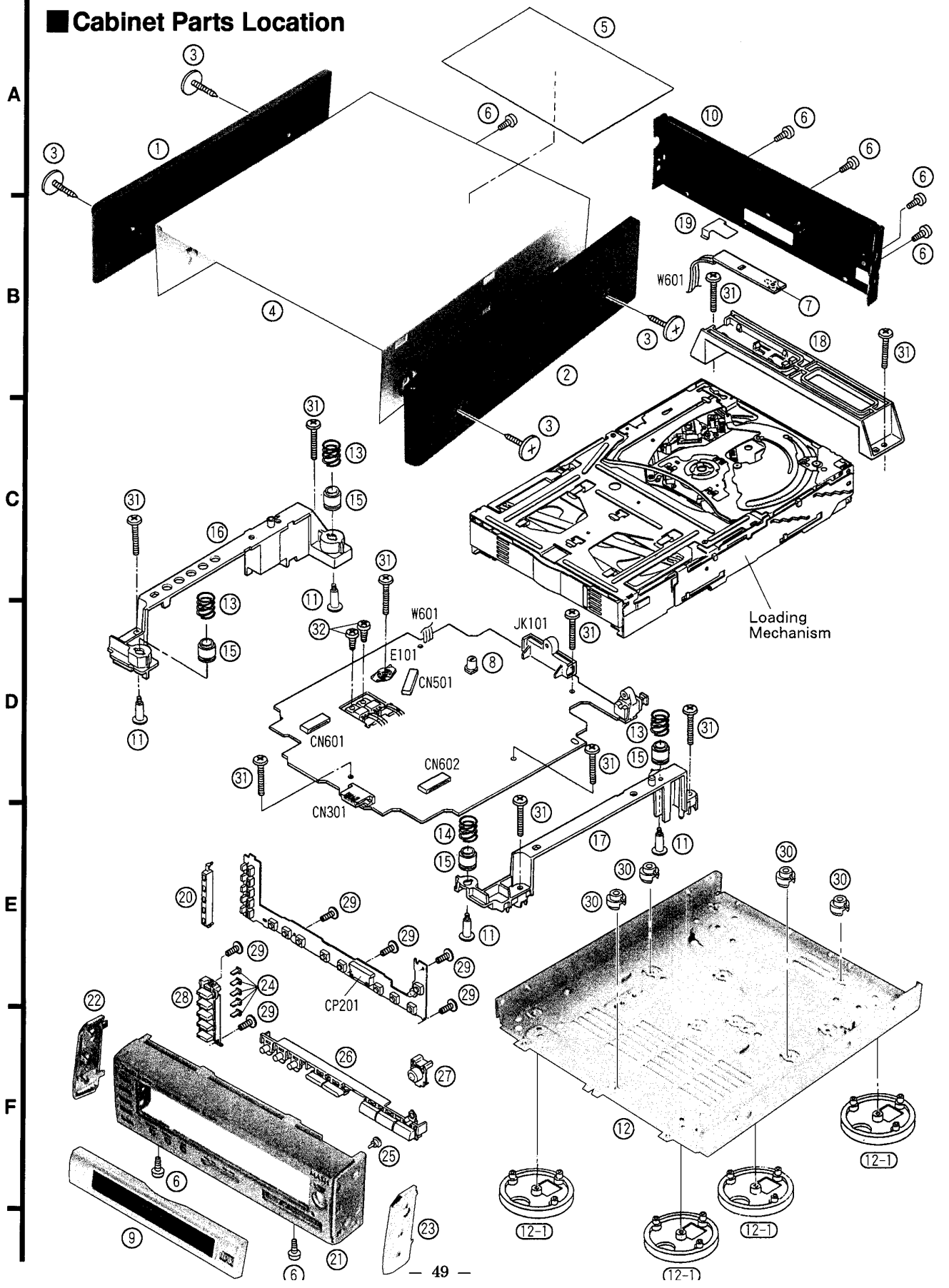
Ref. No.	Part No.	Values & Remarks
C115, 116	ECEA1AKA220B	10V 22U [M]
C117, 118	ECUV1H122KBN	50V 1200P [M]
C119, 120	ECUV1H561KBN	50V 560P [M]
C121, 122	RCE1AKA470BG	10V 47U [M]
C123, 124	ECEA1AKA220B	10V 22U [M]
C125, 126	ECUV1H102KBN	50V 1000P [M]
C127	ECUV1H103KBN	50V 0.01U [M]
C128, 129	ECUV1H222KBN	50V 2200P [M]
C130	ECUV1H102KBN	50V 1000P [M]
C131	RCE1AKA470BG	10V 47U [M]
C132, 133	ECUV1H103KBN	50V 0.01U [M]
C201-203	ECUV1H101JCN	50V 100P [M]
C204	ECUV1H103KBN	50V 0.01U [M]
C301	ECUV1H104ZFM	50V 0.1U [M]
C303	ECUV1H102KBN	50V 1000P [M]
C304	RCE1HKA3R3BG	50V 3.3U [M]
C305	ECEA0JKA470B	6.3V 47U [M]
C306	ECUV1H101JCN	50V 100P [M]
C307-309	ECUV1H102KBN	50V 1000P [M]
C401	ECUV1E104ZFN	25V 0.1U [M]
C402	ECEA0JKA101B	6.3V 100U [M]
C403	ECUV1E104ZFN	25V 0.1U [M]
C404	ECUV1H561KBN	50V 560P [M]
C405	ECUV1H102KBN	50V 1000P [M]
C406	ECUV1E104ZFN	25V 0.1U [M]
C407	ECUV1E223KBN	25V 0.022U [M]
C408	ECUV1E123KBN	25V 0.012U [M]
C409	ECUV1C224KBN	16V 0.22U [M]
C411	ECUV1H104ZFM	50V 0.1U [M]
C414	ECUV1E104ZFN	25V 0.1U [M]
C421	ECUV1H101JCN	50V 100P [M]
C423	ECEA0JKA101B	6.3V 100U [M]
C424	ECUV1H104ZFM	50V 0.1U [M]
C425	ECUV1H103KBN	50V 0.01U [M]
C426, 427	ECUV1H060DCN	50V 6P [M]
C428	ECEA0JKA331B	6.3V 330U [M]
C429, 430	ECUV1H103KBN	50V 0.01U [M]
C431	ECUV1H102KBN	50V 1000P [M]
C501-505	ECUV1E104ZFN	25V 0.1U [M]
C506	ECUV1H103KBN	50V 0.01U [M]
C508	ECUV1H681KBN	50V 680P [M]
C509	ECEA1CKA330B	16V 33U [M]
C510	ECEA0JKA101B	6.3V 100U [M]
C511	ECUV1H104ZFM	50V 0.1U [M]
C512	ECUV1E104ZFN	25V 0.1U [M]
C513	ECUV1E273KBN	25V 0.027U [M]
C514	ECUV1E104ZFN	25V 0.1U [M]
C515	ECUV1H272KBN	50V 2700P [M]
C516	ECUV1E104ZFN	25V 0.1U [M]
C517, 518	ECUV1H103KBN	50V 0.01U [M]
C519	ECUV1C104KBN	16V 0.1U [M]
C520	ECUV1H472KBN	50V 4700P [M]
C521	ECUV1E273KBN	25V 0.027U [M]
C522	ECUV1C473KBN	16V 0.047U [M]
C523	ECUV1H332KBN	50V 3300P [M]
C524	ECUV1H222KBN	50V 2200P [M]
C525	ECUV1H471KBM	50V 470P [M]
C605	ECUV1E104ZFN	25V 0.1U [M]
C613-615	ECUV1H103KBN	50V 0.01U [M]
C616	ECEA1HKA2R2B	50V 2.2U [M]
C617, 618	ECUV1E104ZFN	25V 0.1U [M]
C619	ECUV1C104KBN	16V 0.1U [M]
C620	ECUV1E333KBN	25V 0.033U [M]
C621	ECUV1E104ZFN	25V 0.1U [M]

■ Replacement Parts List (Cabinet)

Notes: * Warning: This product uses a laser diode. Refer to caution statements on page 2.
* ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereinheit darf nur gegen einc vom hersteller spezifizierte einheit ausgetauscht werden.
* [M] indicates in Remarks columns parts that are supplied by MESA.

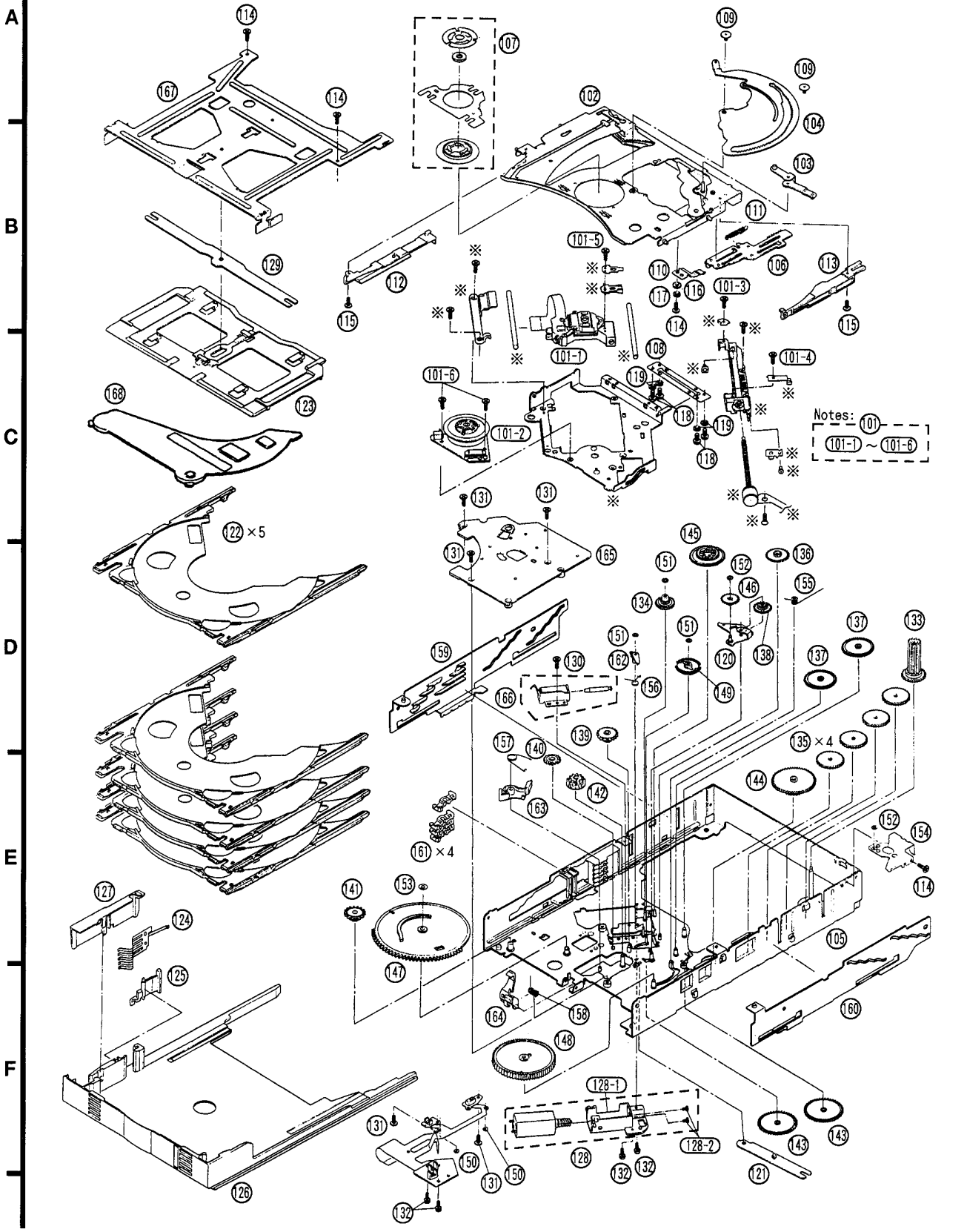
Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS	
1	RGK0817-M	SIDE PANEL(L)	[M]
2	RGK0818-M	SIDE PANEL(R)	[M]
3	RHD30073-K	SCREW	[M]
4	RKM0327-S	CABINET	[M]
5	RQLA0384	CAUTION GUIDE	[M]
6	XTBS3+8JFZ1	SCREW	[M]
7	RMR1038-K	SENSOR HOLDER(D691)	[M]
8	RMR1039-K	SENSOR HOLDER(Q691)	[M]
9	RFKNLHD70EAN	TRAY ORNAMENT ASS'Y	[M]
10	RGR0250B-A	REAR PANEL	[M]
11	RHD26027-K	SCREW	[M]
12	RFKJLHD70E-N	BOTTOM CHASSIS ASS'Y	[M]
12-1	RKA0076-N	FOOT	[M]
13	RMB0518	FLOATING SPRING(A)	[M]
14	RMB0519	FLOATING SPRING(B)	[M]
15	RMG0455-K	FLOATING RUBBER	[M]
16	RMN0410	MECHANISM SPACER(L)	[M]
17	RMN0411	MECHANISM SPACER(R)	[M]
18	RMN0421	MECHANISM SPACER(C)	[M]
19	RMZ0420	INSULATION SHEET	[M]
20	RMR1040-K	L.E.D. HOLDER	[M]
21	RFKGLHD70E-N	FRONT PANEL ASS'Y	[M]
22	RGK0819-N	SIDE ORNAMENT(L)	[M]
23	RGK0820-N	SIDE ORNAMENT(R)	[M]
24	RGL0346-Q	DISC INDEX	[M]
25	RGL0347-Q	L.E.D. INDEX	[M]
26	RGU1484-S	OPERATION BUTTON(A)	[M]
27	RGU1485-S	OPERATION BUTTON(B)	[M]
28	RGU1486-S	DISC BUTTON	[M]
29	XQN26+AJ6FZ	SCREW	[M]
30	SHE170-2	P.C.B. HOLDER	[M]
31	XTB3+12JFZ	SCREW	[M]
32	XTB3+6JFZ	SCREW	[M]

■Cabinet Parts Location



■ Loading Mechanism Parts Location

The parts enclosed in the dotted boxes and ※ mark are supplied as a block assembly. Therefore, they are not supplied separately except parts indicated with Ref. No.



■ Replacement Parts List (Loading Mechanism)

Notes: * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.
* Warning: This product uses a laser diode. Refer to caution statements on page 2.
* ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereinheit darf nur gegen einc vom hersteller spezifizierte einheit ausgetauscht werden.
* [M] indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		LOADING MECHANISM	
101	RAE0161Z	TRAVERSE DECK	[M]⚠
101-1	RAF0140A	OPTICAL PICKUP	[M]
101-2	RFKPQTC500NP	SPINDLE MOTOR ASS'Y	[M]
101-3	XQN17+CF6	SCREW	[M]
101-4	XQN17+CF8	SCREW	[M]
101-5	XQN17+CG45	SCREW	[M]
101-6	XQN17+CM25	SCREW	[M]
102	RFKNQTC500NA	ELEVATION BASE ASS'Y	[M]
103	RFKNQTC500NB	CLAMP TRIGGER ASS'Y	[M]
104	RFKNQTC500NC	E. SEMICIRCULAR PLATE ASS'Y	[M]
105	RXK0208-2	MECHANISM CHASSIS ASS'Y	[M]
106	RFKNQTC500NE	CLAMP RACK PLATE ASS'Y	[M]
107	RFKNQTC500NF	CLAMPER ASS'Y	[M]
108	RMC0304-1	TRAVERSE SPRING PLATE	[M]
109	RHD20040	SCREW	[M]
110	RMC0305-1	CLAMP RACK HOLDER	[M]
111	RMB0480	TRIGGER SPRING	[M]
112	RMQ0604	SUB TRAY GUIDE(L)	[M]
113	RMQ0605	SUB TRAY GUIDE(R)	[M]
114	XQN2+A2	SCREW	[M]
115	XQN2+A25	SCREW	[M]
116	XWA2B	WASHER	[M]
117	XWE2	WASHER	[M]
118	XQN2+AF3	SCREW	[M]
119	XWA2B	WASHER	[M]
120	RXL0137	CONVERSION LEVER UNIT	[M]
121	RXL0138	ELEVATION LEVER UNIT	[M]
122	RMR0996-C	SUB TRAY	[M]
123	RMQ0607	DISC HOLDER	[M]
124	RMC0303	SUB TRAY SPRING PLATE	[M]
125	RML0448	MAIN TRAY HOOK	[M]
126	RMR0995-H	MAIN TRAY	[M]
127	RMR0998-H	MAIN TRAY COVER	[M]
128	REM0065	LOADING MOTOR ASS'Y	[M]
128-1	RMQ0603	MOTOR ANGLE	[M]
128-2	XYN2+C3	SCREW	[M]
129	RMM0157-1	CONNECTING LINK PLATE	[M]

Ref. No.	Part No.	Part Name & Description	Remarks
130	XQN2+A22FZ	SCREW	[M]
131	XQN2+BJ5	SCREW	[M]
132	XYN2+C6	SCREW	[M]
133	RDG0358	ELEVATION GEAR	[M]
134	RDG0360	MOTOR REDUCTION GEAR(A)	[M]
135	RDG0361	ELEVATION TRANSMISSION GEAR	[M]
136	RDG0362	MODE REDUCTION GEAR	[M]
137	RDG0363	CONVER. REDUCTION GEAR(A)	[M]
138	RDG0364	CONVER. REDUCTION GEAR(B)	[M]
139	RDG0365	LOAD GEAR(A)	[M]
140	RDG0366	LOAD GEAR(B)	[M]
141	RDG0367	M TRAY GEAR	[M]
142	RDG0368	S TRAY GEAR(A)	[M]
143	RDG0369	S TRAY GEAR(B)	[M]
144	RDG0370	S TRAY GEAR(C)	[M]
145	RDG0371	MOTOR REDUCTION GEAR(B)	[M]
146	RDG0372	MODE SELECT GEAR	[M]
147	RDK0028	LOAD MAIN GEAR	[M]
148	RDK0029	ELEVATION CAM	[M]
149	RDK0030	CONVERSION CAM	[M]
150	RHR3331ZB	BUSH	[M]
151	RHW12008	WASHER	[M]
152	RHW15002	WASHER	[M]
153	RHW26008	WASHER	[M]
154	RMA0956	ELEVATION GEAR HOLDER	[M]
155	RME0213	CONVERSION LEVER SPRING	[M]
156	RME0214	MODE CONTROL SPRING	[M]
157	RME0219	MODE LOCK LEVER SPRING	[M]
158	RME0222	STOPPER SPRING	[M]
159	RXQ0500	STEP CAM(L) ASS'Y	[M]
160	RXQ0499	STEP CAM(R) ASS'Y	[M]
161	RML0445	SUB TRAY HOOK	[M]
162	RML0446	MODE CONTROL LEVER	[M]
163	RML0447	MODE LOCK LEVER	[M]
164	RML0459	DISC STOPPER	[M]
165	RMQ0608	GEAR COVER	[M]
166	RSJ0016-I	PLUNGER	[M]
167	RFKNLHD70EBN	MECH. CHASSIS BRACKET ASS'Y	[M]
168	RFKNLHD70ECN	DISC SPACER ASS'Y	[M]

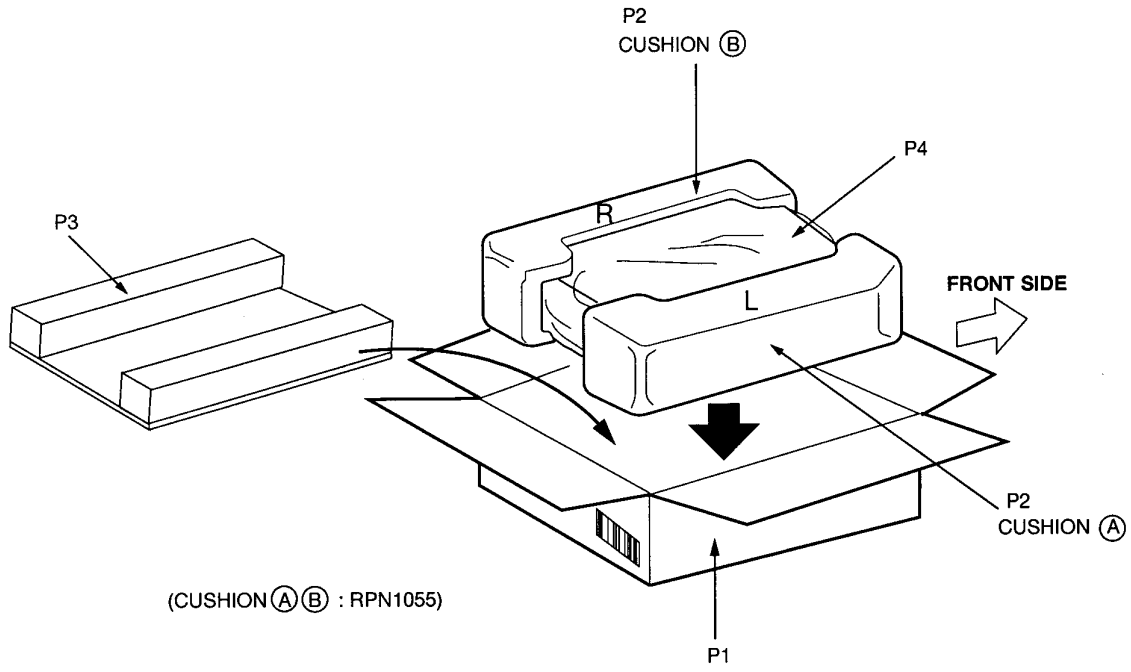
■ Replacement Parts List (Packing Material / Test Disc / Service Kit)

Notes: * [M] indicates in Remarks columns parts that are supplied by MESA.

Ref. No.	Part No.	Part Name & Description	Remarks
		PACKING MATERIAL	
P1	RPG3181	PACKING CASE	[M]
P2	RPN1055	CUSHION	[M]
P3	RPQ0742	PAD	[M]
P4	SPP740	PROTECTION BAG (UNIT)	[M]

Ref. No.	Part No.	Part Name & Description	Remarks
		<GREASE OR JIG/TOOL>	
		SERVICE KIT	
SA1	RFKZ0078	SERVICE KIT	[M]
		TEST DISC	
SA2	SZZP1054C	PLAYABLITY TEST DISC	[M]

■ Packaging



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